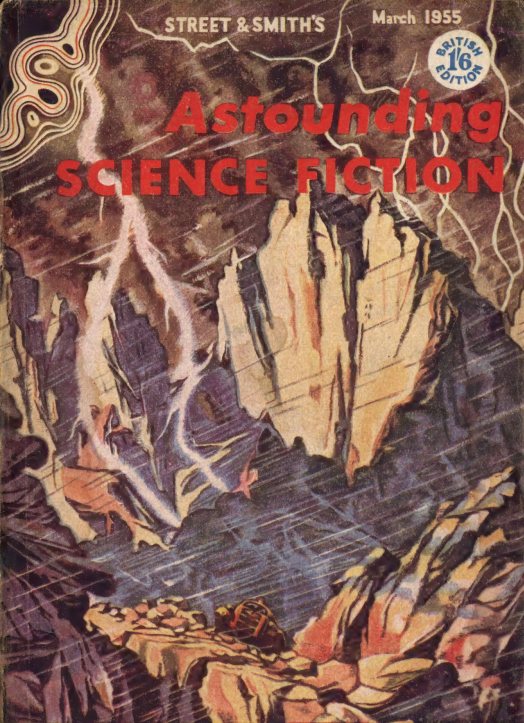


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Astounding SCIENCE FICTION



The Big Rain BY POUL ANDERSON

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• NEXT ISSUE ON SALE MARCH 19, 1955 •

BRAIN-WASHING

FOR ages, Man has hoped that, one day, there would be an end to the sorry, savage business of Man torturing Man.

Gentlemen, I believe the day is close at hand—very near indeed. And you won't like it. There will be sighs for the "good old days" when Man tortured Man.

Somebody made the somewhat bitter remark that "Society puts Truth on a high pedestal so no one will accidentally bump into it and get hurt." There's validity in the comment, for the Truth bears much more resemblance to a porcupine than to a beautiful woman. It's usually decidedly prickly, and frequently acutely uncomfortable. I have an unhappy feeling that Mankind is about to face his ancient enemy, Truth, with the usual reluctance.

The Red brain-washers are forcing us to recognize an exceedingly unpleasant truth; torture is being abandoned, after its many millennia of use, for the same reason horse-stealing is almost completely abandoned. They have something more effective. That Red brain-washing is not torture is not at once obvious, but a little consideration will, I think, indicate that is the case.

First, if we state the actual goal of the brain-washer, it clarifies matters. His goal is to find a technique whereby a courageous, determined man can be made to relinquish his sincerely held system of beliefs, and be forced to accept and act on a system of beliefs more acceptable to the operator.

If we imagine such a technique might be developed, and refer to it as Technique P—a rather startling point emerges. Technique P is, in its very definition, precisely the same thing as a perfected psychotherapeutic technique. The psychiatrist's goal, also, is to perfect a technique whereby a courageous, determined man can be made to relinquish his sincerely—if mistakenly—held beliefs, and be forced to accept and act on a system of beliefs more acceptable to the Society.

"A psychotherapeutic technique" is a neat little semantic trap; it imposes a "good" value judgment. Let's call it a mind-alteration technique; that's what it is. And it is simply and solely a tool. It has, therefore, the characteristics of any other tool—it can be used with exactly equal effect for good or ill. A knife is the generic name under which scalpel belongs. A razor is an instrument used for cutting throats. Fire has long been used for torturing people—and is Man's most potent, most valuable tool.

Brain-washing is simply psychiatry-gone-wrong. It is not torture. That's why I suggest that the end of torture-chambers is close at hand; the man who really wants information, or to change someone's beliefs, has a much more effective technique. Torture will remain only as a sadist's method of amusing himself. It will have no function.

The important part of this fact lies in this: courage and determination have, in the past, permitted men to resist efforts to break their wills—have permitted men to hold secrets, despite all the torturer could do. But courage and determination have nothing to do with mind-alteration techniques; they don't

work at that level. Instead of seeking to force a change by sheer agony, they rely on inducing changes in the brain itself.

To clarify the difference: One psychiatric technique is the prefrontal lobotomy. This isn't a matter of torture; it's painless. But it severs the nerve-trunk by which the judgment faculty controls the organism. Whether the individual's "will" continues to exist somewhere or not is beside the point; its communication with the organism has been severed. The result is a living robot; the terms "courage" or "determination" no longer can be applied to the individual. If he retains those qualities, it is impossible to know it, because the nerve-trunk which would carry their control messages has been cut. If the optic nerve is severed, the eye may still be perfectly functional, but it will have no effect in guiding the organism.

The brain-washer, having no concern about the subsequent health of the individual on whom he's working, can use the mind-alteration techniques with considerably greater freedom than can the psychiatrist. The psychiatrist tries to leave some degree of self-determination in the individual; the brain-washer doesn't want any.

There is, now, a greatly improved substitute for the prefrontal lobotomy. A hypodermic needle can be inserted back of the eyeball, and novacaine injected directly into the brain tissues. The effect is a temporary—as long as the novacaine lasts—prefrontal lobotomy which leaves no detectable permanent damage to brain tissue, and no visible scar. The operation is highly useful, because when the effective control of the judgment centers is eliminated either by severing, or paralyzing, the nerve-trunk, memories suppressed by the sense of guilt, shame, fear, or sorrow become readily available to a questioner. The patient so treated can't exercise censorship, and the questioner can explore his memories in greater freedom than can the individual himself in his normal state.

And friends, if you have an organic brain of the human type—*this will work on you*. Don't kid yourself with lovely fantasies about "Nobody can make *me* talk if I don't want to!" With a load of novacaine in the right place, you don't have to be consulted—your body will do the talking.

That's the difference, you see. The torturer tried to force the individual to surrender, to give up all resistance. The mind-alteration technique doesn't do that at all; it just eliminates the faculty of judgment from the scene, and works with the biological machine that's left. I don't know—judgment may still be present. But what of it? It can't do anything!

One technique of torture used to involve getting a stubborn man's wife or child, and do unpleasant things to them in his presence. With the mind-alteration technique, the man would be will-less, and would do the unpleasant

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things to them himself, if so commanded. There's a very basic difference in the modern brain-wash approach.

Obviously, there is no such thing as keeping a secret if a man knowing that secret is captured. That was possible only when torture was the method used for forcing revelations.

Psychiatric research has also led to the insulin-shock technique. The lobotomy methods are totally unsatisfactory as curative procedures; they are used simply to make the violent patient less of a burden on the community. You can't cure a mis-directed determination by eliminating determination. The insulin-shock therapy, however, seeks to produce a change of direction of determination—a very different thing.

It depends on the fact that, if the brain is starved of sugar or of oxygen, the judgment faculty is the first to go. If starvation is maintained, the judgments, beliefs, and opinions of the mind seem to slump, weaken, and permit of some realignment.

The Red brain-washers use a more vigorous approach to this same technique; they produce a state of semi-starvation in the individual, and weaken the resistance of the whole organism with cold, damp, and by encouraging chronic minor infections such as colds. In addition, the intellect is starved by solitary confinement, an additional effective factor. How can you know you are having hallucinations, if you can't check with someone? That your ideas are slipping sidewise, and your judgments weakening and fogging, if there is no other mind to consult?

The physical discomfort experienced by the victim—hunger, chill, misery—is of no importance; this isn't torture at all. It's dependent on the fact that a brain operating on a biochemical principle won't work right if it isn't fueled. A psychotherapy based on this technique, rather than insulin shock, would be far more effective—if it weren't considered cruel to maintain a human being in semistarvation and misery for prolonged periods. For brain-washers, it works fine.

The brain rendered incapable of functioning can then be worked on very effectively. The only break in solitary confinement, and the drifting, meaningless, ghostly confusions, is discussion with a man implanting a new orientation. Gradually the diet is increased, and the brain begins to function a bit better. The new orientation has been implanted, and it will take months of good diet and free conversation to shake it off.

In the interim, the individual can be relied on to live and act on the basis of the new orientations. When questioned, he will "confess" to things he has "learned."

Any organism using a biochemically powered brain can be affected in this way; courage and determination are meaningless terms at the level of biochemistry. Think you can think clearly with no oxygen reaching the brain? It's easy to read what happens to a pilot flying too high without an oxygen mask. He *thinks* his judgment is still working—because the judgment needed to detect that it is *not* working isn't there!

Now it is time to recognize that torture is no longer to be expected, and to align our thinking in a new way. No one can nobly resist questioning—after a small piece of his brain has been removed. Or after his judgment faculty has been paralyzed by a dose of novacaine. That's obvious.

Equally, brain-washing will work on any human organism. Your ideas, your ideals, have nothing to do with the matter; it's a simple question of whether you need food and oxygen to live. If you do, then don't make up hero-fantasies about yourself. Unless you can repeat Christ's miracle of the loaves and the fishes, and feed yourself under the circumstances, you're not immune.

Then what can be done?

Nothing—directly. As usual, it's a matter of the Society having to take measures to protect the individual. In this case, it seems to me that it's necessary to have the simple, deadly, and brutal facts publicized everywhere; nothing remotely human can resist brain-washing. Any individual is an extraterrestrial entity. Why such publicity?

The brain-washing is done for propaganda purposes. If it is once clearly, thoroughly, and universally recognized that any human being can be made to say—and believe!—anything whatever by means of these techniques—then the propaganda value is reduced to zero. The brain-washers will still be able to—but why take the trouble, when it has no value?

The United Nations, and each individual nation, I suggest, should officially publicize the facts on how psychiatric techniques can be misapplied. Further, every nation should officially order any captured man to become a psychopathic liar—to freely swear to anything, promise anything, agree to anything. Not that such agreement would help him directly, of course—but that *if all the world knows that our men have been ordered to "confess" to anything whatever*, then any "confession" issued by their captors would be automatically valueless.

That can't stop the brain-washers, of course—but it will make their task unrewarding. It will protect some of our men, anyway.

THE EDITOR.

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THE BIG RAIN

By POUL ANDERSON

The Big Rain was the goal of the Big Job, and for that goal men were willing to work at practically slave levels. The trouble in that is that while it's a good idea . . . it gives some people other ideas!

Illustrated by van Dongen

I.

THE room was small and bare, nothing but a ventilator grill to relieve the drabness of its plastic walls, no furniture except a table and a couple of benches. It was hot, and the cold light of fluoros glistened off the sweat which covered the face of the man who sat there alone.

He was a big man, with hard bony features under close-cropped reddish-brown hair; his eyes were gray, with something chilly in them, and moved



restlessly about the chamber to assess its crude homemade look. The coverall which draped his lean body was a bit too colorful. He had fumbled a cigarette out of his belt pouch and it smoldered between his fingers, now and then he took a heavy drag on it. But he sat quietly enough, waiting.

The door opened and another man came in. This one was smaller, with bleak features. He wore only shorts to whose waistband was pinned a star-shaped badge, and a needle-gun holstered at his side, but somehow he had a military look.

"Simon Hollister?" he asked unnecessarily.

"That's me," said the other, rising. He loomed over the newcomer, but he was unarmed; they had searched him thoroughly the minute he disembarked.

"I am Captain Karsov, Guardian Corps." The English was fluent, with only a trace of accent. "Sit down." He lowered himself to a bench. "I am only here to talk to you."

Hollister grimaced. "How about some lunch?" he complained. "I haven't eaten for"—he paused a second—"thirteen hours, twenty-eight minutes."

His precision didn't get by Karsov, but the officer ignored it for the time being. "Presently," he said. "There isn't much time to lose, you know. The last ferry leaves in forty hours, and we have to find out before then if you are acceptable or must go back on it."

"Hell of a way to treat a guest," grumbled Hollister.

"We did not ask you to come," said Karsov coldly. "If you wish to stay on Venus, you had better conform to the regulations. Now, what do you think qualifies you?"

"To live here? I'm an engineer. Construction experience in the Amazon basin and on Luna. I've got papers to prove it, and letters of recommendation, if you'd let me get at my baggage."

"Eventually. What is your reason for emigrating?"

Hollister looked sullen. "I didn't like Earth."

"Be more specific. You are going to be narcoquizzed later, and the whole truth will come out. These questions are just to guide the interrogators, and the better you answer me now the quicker and easier the quiz will be for all of us."

Hollister bristled. "That's an invasion of privacy."

"Venus isn't Earth," said Karsov with an attempt at patience. "Before you were even allowed to land, you signed a waiver which puts you completely under our jurisdiction as long as you are on this planet. I could kill you, and the UN would not have a word to say. But we do need skilled men, and I would rather O.K. you for citizenship. Do not make it too hard for me."

"All right." Hollister shrugged heavy shoulders. "I got in a fight with a man. He died. I covered up the traces pretty well, but I could never be sure—sooner or later the police might get on to the truth, and I don't like the idea of corrective treatment. So I figured I'd better blow out while I was still unsuspected."

"Venus is no place for the rugged individualist, Hollister. Men have to work together, and be very tolerant of each other, if they are to survive at all."

"Yes, I know. This was a special case. The man had it coming." Hollister's face twisted. "I have a daughter—Never mind. I'd rather tell it under narco than consciously. But I just couldn't see letting a snake like that get 'corrected' and then walk around free again." Defensively: "I've always been a rough sort, I suppose, but you've got to admit this was extreme provocation."

"That is all right," said Karsov, "if you are telling the truth. But if you have family ties back on Earth, it might lessen your usefulness here."

"None," said Hollister bitterly. "Not any more."

The interview went on. Karsov extracted the facts skillfully: Hollister, Simon James; born Frisco Unit, U.S.A., of good stock; chronological age, thirty-eight Earth-years; physiological age, thanks to taking intelligent advantage of biomedics, about twenty-five; Second-class education, major in civil engineering with emphasis on nuclear-powered construction machines; work record; psych rating at last checkup; et cetera, et cetera, et cetera. Somewhere a recorder took sound and visual impressions of every nuance for later analysis and filing.

At the end, the Guardian rose and stretched. "I think you will do," he said. "Come along now for the narcoquiz. It will take about three hours, and you will need another hour to recover, and then I will see that you get something to eat."

The city crouched on a mountainside in a blast of eternal wind. Overhead rolled the poisonous gray clouds; sometimes a sleet of paraformaldehyde hid the grim red slopes around, and always the scudding dust veiled men's eyes so they could not see the alkali desert below. Fantastically storm-gnawed crags loomed over the city, and often there was the nearby rumble of an avalanche, but the ledge on which it stood had been carefully checked for stability.

The city was one armored unit of metal and concrete, low and rounded as if it hunched its back against the shrieking steady gale. From its shell protruded the stacks of hundreds of outsize Hilsch tubes, swivel-mounted so that they always faced into the wind. It blew past filters which caught the flying dust and sand and tossed them down a series of chutes to the cement factory. The tubes grabbed the rushing air and separated fast and slow molecules; the cooler part went into a refrigeration system which kept the city at a temperature men could stand—outside, it hovered around the boiling point of water; the smaller volume of super-heated air was conducted to the maintenance plant where it helped run the city's pumps and generators. There were also nearly a thousand windmills, turning furiously and drinking the force of the storm.

None of this air was for breathing. It was thick with carbon dioxide; the rest was nitrogen, inert gases, formaldehyde vapor, a little methane and ammonia. The city devoted many hectares of space to hydroponic plants which renewed its oxygen and supplied some of the food, as well as to chemical purifiers, pumps, and blowers. "Free as air" was a joke on Venus.

Near the shell was the spaceport where ferries from the satellite station and the big interplanetary ships landed. Pilots had to be good to bring down a vessel, or even take one up, under such conditions as prevailed here. Except for the landing cradles, the radio mast and the GCA shack in the main shell, everything was underground, as most of the city was.

Some twenty thousand colonists lived there. They were miners, engineers, laborers, technicians in the food and maintenance centers. There were three doctors, a scattering of teachers and librarians and similar personnel, a handful of police and administrators. Exactly fifteen people were employed in brewing, distilling, tavern-running, movie operation, and the other non-essential occupations which men required as they did food and air.

This was New America, chief city of Venus in 2051 A.D.

Hollister didn't enjoy his meal. He got it, cafeteria style, in one of the big plain messhalls, after a temporary ration book had been issued him. It consisted of a few vegetables, a lot of potato, a piece of the soggy yeast synthetic which was the closest to meat Venus offered—all liberally loaded with a tasteless basic food concentrate—a vitamin capsule, and a glass of flavored water. When he took out one of his remaining cigarettes, a score of eyes watched it hungrily. Not much tobacco here either. He inhaled savagely, feeling the obscure guilt of the have confronted with the have-not.

There were a number of people in the room with him, eating their own rations. Men and women were represented about equally. All wore coveralls or the standard shorts, and most looked young, but hard too, somehow—even the women. Hollister was used to female engineers and technicians at home, but here *everybody* worked.

For the time being, he stuck to his Earthside garments.

He sat alone at one end of a long table, wondering why nobody talked to him. You'd think they would be starved for a new face and word from Earth. Prejudice? Yes, a little of that, considering the political situation; but Hollister thought something more was involved.

Fear. They were all afraid of something.

When Karsov strolled in, the multilingual hum of conversation died, and Hollister guessed shrewdly at the fear. The Guardian made his way directly

to the Earthling's place. He had a blocky, bearded man with a round smiling face in tow.

"Simon Hollister . . . Heinrich Gebhardt," the policeman introduced them. They shook hands, sizing each other up. Karsov sat down. "Get me the usual," he said, handing over his ration book.

Gebhardt nodded and went over to the automat. It scanned the books and punched them when he had dialed his orders. Then it gave him two trays, which he carried back.

Karsov didn't bother to thank him. "I have been looking for you," he told Hollister. "Where have you been?"

"Just wandering around," said the Earthling cautiously. Inside, he felt muscles tightening, and his mind seemed to tilt forward, as if sliding off the hypnotically imposed pseudo-personality which had been meant as camouflage in the narcoquiz. "It's quite a labyrinth here."

"You should have stayed in the barracks," said Karsov. There was no expression in his smooth-boned face; there never seemed to be. "Oh, well. I wanted to say you have been found acceptable."

"Good," said Hollister, striving for imperturbability.

"I will administer the oath after lunch," said Karsov. "Then you will be a full citizen of the Venusian Federation. We do not hold with formalities, you see—no time." He reached into a pocket and got out a booklet which he gave to Hollister. "But I advise you to study this carefully. It is a resumé of the most important laws, insofar as they differ from Earth's. Punishment for infraction is severe."

Gebhardt looked apologetic. "It hass to be," he added. His bass voice had a slight blur and hiss of German accent, but he was good at the English which was becoming the common language of Venus. "This planet vas made in hell. If ve do not all work together, ve all die."

"And then, of course, there is the trouble with Earth," said Karsov. His narrow eyes studied Hollister for a long moment. "Just how do people back there feel about our declaration of independence?"

"Well—" Hollister paused. Best to tell the unvarnished truth, he decided. "Some resentment, of course. After all the money we . . . they . . . put into developing the colonies—"

"And all the resources they took out," said Gebhardt. "Men vere planted on Venus back in the last century to mine fissionables, vich vere getting short efen then. The colonies vere made self-supporting because that vas cheaper than hauling supplies for them, vich vould haff been an impossible task anyway. Some of the colonies vere penal, some vere manned by arbitrarily assigned personnel; the so-called democracies often relied on broken men, who could not find vork at home or who had been displaced by var. No, ve owe them notting."

Hollister shrugged. "I'm not arguing. But people do wonder why, if you wanted national status, you didn't at least stay with the UN. That's what Mars is doing."

"Because we are . . . necessarily . . . developing a whole new civilization here, something altogether remote from anything Earth has ever seen," snapped Karsov. "We will still trade our fissionables for things we need, until the day

we can make everything here ourselves, but we want as little to do with Earth as possible. Never mind, you will understand in time."

Hollister's mouth lifted in a crooked grin. There hadn't been much Earth could do about it; in the present stage of astronautics, a military expedition to suppress the nationalists would cost more than anyone could hope to gain even from the crudest imperialism. Also, as long as no clear danger was known to exist, it wouldn't have sat well with a planet sick of war; the dissension produced might well have torn the young world government, which still had only limited powers, apart.

But astronautics was going to progress, he thought grimly. Spaceships wouldn't have to improve much to carry, cheaply, loads of soldiers in cold sleep, ready to land when thermonuclear bombardment from the skies had smashed a world's civilization. And however peaceful Earth might be, she was still a shining temptation to the rest of the System, and it looked very much as if something was brewing here on Venus which could become ugly before the century was past.

Well—

"Your first assignment is already arranged," said Karsov. Hollister jerked out of his reverie and tried to keep his fists unclenched. "Gebhardt will be your boss. If you do well, you can look for speedy promotion. Meanwhile"—he flipped a voucher across—"here is the equivalent of the dollars you had along, in our currency."

Hollister stuck the sheet in his pouch. It was highway robbery, he knew, but he was in no position to complain and the Venusian government wanted the foreign exchange. And he could only buy trifles with it anyway; the essentials were issued without payment, the size of the ration depending on rank. Incentive bonuses were money, though, permitting you to amuse yourself but not to consume more of the scarce food or textiles or living space.

He reflected that the communist countries before World War Three had never gone this far. Here, everything was government property. The system didn't call itself communism, naturally, but it was, and probably there was no choice. Private enterprise demanded a fairly large economic surplus, which simply did not exist on Venus.

Well, it wasn't his business to criticize their internal arrangements. He had never been among the few fanatics left on Earth who still made a god of a particular economic set-up.

Gebhardt cleared his throat. "I am in charge of the atmosphere detail in this district," he said. "I am here on leave, and will be going back later today. Very glad to haff you, Hollister, ve are always short of men. Ve lost two in the last rock storm."

"Cheerful news," said the Earthman. His face resumed its hard woodenness. "Well, I didn't think Venus was going to be any bed of roses."

"It vill be," said Gebhardt. Dedication glowed on the hairy face. "Some day it vill be."

II.

The oath was pretty drastic: in effect, Hollister put himself completely at the mercy of the Technic Board, which for all practical purposes was the

city government. Each colony, he gathered, had such a body, and there was a federal board in this town which decided policy for the entire planet.

Anyone who wished to enter the government had to pass a series of rigid tests, after which there were years of apprenticeship and study, gradual promotion on the recommendation of seniors. The study was an exhausting course of history, psychotechnics, and physical science: in principle, thought Hollister, remembering some of the blubberheads who still got themselves elected at home, a good idea. The governing boards combined legislative, executive, and judicial functions, and totaled only a couple of thousand people for the whole world. It didn't seem like much for a nation of nearly two million, and the minimal paperwork surprised him—he had expected an omnipresent bureaucracy.

But of course they had the machines to serve them, recording everything in electronic files whose computers could find and correlate any data and were always checking up. And he was told pridefully that the schools were inculcating the rising generation with a tight ethic of obedience.

Hollister had supper, and returned to the Casual barracks to sleep. There were only a few men in there with him, most of them here on business from some other town. He was wakened by the alarm, whose photocells singled him out and shot forth a supersonic beam; it was a carrier wave for the harsh ringing in his head which brought him to his feet.

Gebhardt met him at an agreed-on locker room. There was a wiry, tough-looking Mongoloid with him who was introduced as Henry Yamashita. "Stow your fancy clothes, boy," boomed the chief, "and get on some TBI's." He handed over a drab, close-fitting coverall.

Hollister checked his own garments and donned the new suit wordlessly. After that there was a heavy plasticord outfit which, with boots and gloves, decked his whole body. Yamashita helped him strap on the oxygen bottles and plug in the Hilsch cooler. The helmet came last, its shoulderpiece buckled to the airsuit, but all of them kept theirs hinged back to leave their heads free.

"If someth'ing happens to our tank," said Gebhardt, "you slap that helmet down fast. Or maybe you like being embalmed. Haw!" His cheerfulness was more evident when Karsov wasn't around.

Hollister checked the valves with the caution taught him on Luna—his engineering experience was not faked. Gebhardt grunted approvingly. Then they slipped on the packs containing toilet kits, change of clothes, and emergency rations; clipped ropes, batteries, and canteens to their belts—the latter with the standard sucker tubes by which a man could drink directly even in his suit; and clumped out of the room.

A descending ramp brought them to a garage where the tanks were stored. These looked not unlike the sandcats of Mars, but were built lower and heavier, with a refrigerating tube above and a grapple in the nose. A mechanic gestured at one dragging a covered steel wagon full of supplies, and the three men squeezed into the tiny transparent cab.

Gebhardt gunned the engine, nodding as it roared. "O.K.," he said. "On ye go."

"What's the power source?" asked Hollister above the racket.

"Alcohol," answered Yamashita. "We get it from the formaldehyde. Bottled



oxygen. A compressor and cooling system to keep the oxy tanks from blowing up on us—not that they don't once in a while. Some of the newer models use a peroxide system."

"And I suppose you save the water vapor and CO_2 to get the oxygen back," ventured Hollister.

"Just the water. There's always plenty of carbon dioxide." Yamashita looked out, and his face set in tight lines.

The tank waddled through the great air lock and up a long tunnel toward the surface. When they emerged, the wind was like a blow in the face. Hollister felt the machine shudder, and the demon howl drowned out the engine. He accepted the earplugs Yamashita handed him with a grateful smile.

There was dust and sand scudding by them, making it hard to see the mountainside down which they crawled. Hollister caught glimpses of naked fanglike peaks, raw slashes of ocher and blue where minerals veined the land, the steady march of dunes across the lower ledges. Overhead, the sky was an unholy tide of ragged, flying clouds, black and gray and sulfurous yellow. He could not see the sun, but the light around him was a weird hard brass color, like the light on Earth just before a thunderstorm.

The wind hooted and screamed, banging on the tank walls, yelling and

rattling and groaning. Now and then a dull quiver ran through the land and trembled in Hollister's bones, somewhere an avalanche was ripping out a mountain's flanks. Briefly, a veil of dust fell so thick around them that they were blind, grinding through an elemental night with hell and the furies loose outside. The control board's lights were wan on Gebhardt's intent face, most of the time he was steering by instruments.

Once the tank lurched into a gully. Hollister, watching the pilot's lips, thought he muttered: "Damn! That wasn't here before!" He extended the grapple, clutching rock and pulling the tank and its load upward.

Yamashita clipped two small disks to his larynx and gestured at the same equipment hanging on Hollister's suit. His voice came thin but fairly clear: "Put on your talkie unit if you want to say anything." Hollister obeyed, guessing that the earplugs had a transistor arrangement powered by a piece of radioactive isotope which reproduced the vibrations in the throat. It took concentration to understand the language as they distorted it, but he supposed he'd catch on fast enough.

"How many hours till nightfall?" he asked.

"About twenty." Yamashita pointed to the clock on the board, it was calibrated to Venus' seventy-two hour day. "It's around one hundred thirty kilometers to the camp, so we should just about make it by sunset."

"That isn't very fast," said Hollister. "Why not fly, or at least build roads?"

"The aircraft are all needed for speed travel and impassable terrain, and the roads will come later," said Yamashita. "These tanks can go it all right—the most of the time."

"But why have the camp so far from the city?"

"It's the best location from a supply standpoint. We get most of our food from Little Moscow, and water from Hellfire, and chemicals from New America and Roger's Landing. The cities more or less specialize, you know. They have to: there isn't enough iron ore and whatnot handy to any one spot to build a city big enough to do everything by itself. So the air camps are set up at points which minimize the total distance over which supplies have to be hauled."

"You mean action distance, don't you? The product of the energy and time required for hauling."

Yamashita nodded, with a new respect in his eyes. "You'll do," he said.

The wind roared about them. It was more than just the slow rotation of the planet and its nearness to the sun which created such an incessant storm; if that had been all, there would never have been any chance of making it habitable. It was the high carbon dioxide content of the air, and its greenhouse effect; and in the long night, naked arid rock cooled off considerably. With plenty of water and vegetation, and an atmosphere similar to Earth's, Venus would have a warm but rather gentle climate on the whole, the hurricanes moderated to trade winds; indeed, with the lower Coriolis force, the destructive cyclones of Earth would be unknown.

Such, at least, was the dream of the Venusians. But looking out, Hollister realized that a fraction of the time and effort they were expending would have made the Sahara desert bloom. They had been sent here once as miners, but there was no longer any compulsion on them to stay; if they asked to come back to Earth, their appeal could not be denied however expensive it would be to ship them all home.

Then why didn't they?

*Well, why go back to a rotten civilization like—*Hollister caught himself. Sometimes his pseudomemories were real enough in him to drown out the genuine ones, rage and grief could nearly overwhelm him till he recalled that the sorrow was for people who had never existed. The anger had had to be planted deep, to get by a narcoquiz, but he wondered if it might not interfere with his mission, come the day.

He grinned sardonically at himself. One man, caught on a planet at the gates of the Inferno, watched by a powerful and ruthless government embracing that entire world, and he was setting himself against it.

Most likely he would die here, and the economical Venusians would process his body for its chemicals as they did other corpses, and that would be the end of it as far as he was concerned.

Well, he quoted to himself, a man might try.

Gebhardt's camp was a small shell, a radio mast, and a shed sticking out of a rolling landscape of rock and sand; the rest was underground. The sun was down on a ragged horizon, dimly visible as a huge blood-red disk, when he arrived. Yamashita and Hollister had taken their turns piloting; the Earthman found it exhausting work, and his head rang with the noise when he finally stepped out into the subterranean garage.

Yamashita led him to the barracks. "We're about fifty here," he explained. "All men." He grinned. "That makes a system of minor rewards and punishments based on leaves to a city very effective."

The barracks was a long room with triple rows of bunks and a few tables and chairs; only Gebhardt rated a chamber of his own, though curtains on the bunks did permit some privacy. An effort had been made to brighten the place up with murals, some of which weren't bad at all, and the men sat about reading, writing letters, talking, playing games. They were the usual conglomerate of races and nationalities, with some interesting half-breeds; hard work and a parsimonious diet had made them smaller than the average American or European, but they looked healthy enough.

"Simon Hollister, our new sub-engineer," called Yamashita as they entered. "Just got in from Earth. Now you know as much as I do." He flopped onto a bunk while the others drifted over. "Go ahead. Tell all. Birth, education, hobbies, religion, sex life, interests, prejudices—they'll find it out anyway, and God knows we could use a little variety around here."

A stocky blond man paused suspiciously. "From Earth?" he asked slowly. "We've had no new people from Earth for thirty years. What did you want to come here for?"

"I felt like it," snapped Hollister. "That's enough!"

"So, a jetheading snob, huh? We're too good for you, I guess."

"Take it easy, Sam," said someone else.

"Yeah," a Negro grinned, "he might be bossin' you, you know."

"That's just it," said the blond man. "I was born here. I've been studying, and I've been on air detail for twenty years, and this bull walks right in and takes my promotion the first day."

Part of Hollister checked off the fact that the Venusians used the terms "year" and "day" to mean those periods for their own world, one shorter and

one longer than Earth's. The rest of him tightened up for trouble, but others intervened. He found a vacant bunk and sat down on it, swinging his legs and trying to make friendly conversation. It wasn't easy. He felt terribly alone.

Presently someone got out a steel and plastic guitar and strummed it, and soon they were all singing. Hollister listened with half an ear.

*"When the Big Rain comes, all the air will be good,
and the rivers all flow with beer,
with the cigarets bloomin' by the beefsteak bush,
and the ice-cream-bergs right here.
When the Big Rain comes, we will all be a-swillin'
of champagne, while the violin tree
plays love songs because all the gals will be willin',
and we'll all have a Big Rain spree!—"*

Paradise, he thought. They can joke about it, but it's still the Paradise they work for and know they'll never see. Then why do they work for it? What is it that's driving them?

After a meal, a sleep, and another meal, Hollister was given a set of blueprints to study. He bent his mind to the task, using all the powers which an arduous training had given it, and in a few hours reported to Gebhardt. "I know them," he said.

"Already?" The chief's small eyes narrowed. "It iss not vort' vile trying to bluff here, boy. Venus always callss it."

"I'm not bluffing," said Hollister angrily. "If you want me to lounge around for another day, O.K., but I know those specs by heart."

The bearded man stood up. There was muscle under his plumpness. "O.K., by damn," he said. "You go out vit me next trip."

That was only a few hours off. Gebhardt took a third man, a quiet grizzled fellow they called Johnny, and let Hollister drive. The tank hauled the usual wagonload of equipment, and the rough ground made piloting a harsh task. Hollister had used multiple transmissions before, and while the navigating instruments were complicated, he caught on to them quickly enough; it was the strain and muscular effort that wore him out.

Venus' night was not the pitchy gloom one might have expected. The clouds diffused sunlight around the planet, and there was also a steady flicker of aurora even in these middle latitudes. The headlamps were needed only when they went into a deep ravine. Wind growled around them, but Hollister was getting used to that.

The first airmaker on their tour was only a dozen kilometers from the camp. It was a dark, crouching bulk on a stony ridge, its intake funnel like the rearing neck of some archaic monster. They pulled up beside it, slapped down their helmets, and went one by one through the air lock. It was a standard midget type, barely large enough to hold one man, which meant little air to be pumped out and hence greater speed in getting through. Gebhardt had told Hollister to face the exit leeward; now the three roped themselves together and stepped around the tank, out of its shelter.

Hollister lost his footing, crashed to the ground, and went spinning away

in the gale. Gebhardt and Johnny dug their cleated heels in and brought the rope up short. When they had the new man back on his feet, Hollister saw them grinning behind their faceplates. Thereafter he paid attention to his balance, leaning against the wind.

Inspection and servicing of the unit was a slow task, and it was hard to see the finer parts even in the headlights' glare. One by one, the various sections were uncovered and checked, adjustments made, full gas bottles removed and empty ones substituted.

It was no wonder Gebhardt had doubted Hollister's claim. The airmaker was one of the most complicated machines in existence. A thing meant to transform the atmosphere of a planet had to be.

The intake scooped up the wind and drove it, with the help of wind-powered compressors, through a series of chambers; some of them held catalysts, some electric arcs or heating coils maintaining temperature—the continuous storm ran a good-sized generator—and some led back into others in a maze of interconnections. The actual chemistry was simple enough. Paraffin was broken down and yielded its binding water molecules; the formaldehyde, together with that taken directly from the air, reacted with ammonia and methane—or with itself—to produce a whole series of hydrocarbons, carbohydrates, and more complex compounds for food, fuel and fertilizer; such carbon dioxide as did not enter other reactions was broken down by sheer brute force in an arc to oxygen and soot. The oxygen was bottled for industrial use; the remaining substances were partly separated by distillation—again using wind power, this time to refrigerate—and collected. Further processing would take place at the appropriate cities.

Huge as the unit loomed, it seemed pathetically small when you thought of the fantastic tonnage which was the total planetary atmosphere. But more of its kind were being built every day and scattered around the surface of the world; over a million already existed, seven million was the goal, and that number should theoretically be able to do the job in another twenty Earth-years.

That was theory, as Gebhardt explained over the helmet radio. Other considerations entered, such as the law of diminishing returns: as the effect of the machines became noticeable, the percentage of the air they could deal with would necessarily drop; then there was stratospheric gas, some of which apparently never got down to the surface; and the chemistry of a changing atmosphere had to be taken into account. The basic time estimate for this work had to be revised upward another decade.

There was oxygen everywhere, locked into rocks and ores, enough for the needs of man if it could be gotten out. Specially mutated bacteria were doing that job, living off carbon and silicon, releasing more gas than their own metabolisms took up; their basic energy source was the sun. Some of the oxygen recombined, of course, but not enough to matter, especially since it could only act on or near the surface and most of the bacterial gnawing went on far down. Already there was a barely detectable percentage of the element in the atmosphere. By the time the airmakers were finished, the bacteria would also be.

Meanwhile giant pulverizers were reducing barren stone and sand to fine particles which would be mixed with fertilizers to yield soil; and the genetic

engineers were evolving still other strains of life which could provide a balanced ecology; and the water units were under construction.

These would be the key to the whole operation. There was plenty of water on Venus, trapped down in the body of the planet, and the volcanoes brought it up as they had done long ago on Earth. Here it was quickly snatched by the polymerizing formaldehyde, except in spots like Hellfire where machinery had been built to extract it from magma and hydrated minerals. But there was less formaldehyde in the air every day.

At the right time, hydrogen bombs were to be touched off in places the geologists had already selected, and the volcanoes would all wake up. They would spume forth plenty of carbon dioxide—though by that time the amount of the free gas would be so low that this would be welcomed—but there would be water too, unthinkable tons of water. And simultaneously aircraft would be sowing platinum catalyst in the skies, and with its help Venus' own lightning would attack the remaining poisons in the air. They would come down as carbohydrates and other compounds, washed out by the rain and leached from the sterile ground.

That would be the Big Rain. It would last an estimated ten Earth-years, and at the end there would be rivers and lakes and seas on a planet which had never known them. And the soil would be spread, the bacteria and plants and small animal life released. Venus would still be mostly desert, the rains would slacken off but remain heavy for centuries, but men could walk unclothed on this world and they could piece by piece make the desert green.

A hundred years after the airmen had finished their work, the reclaimed sections might be close to Earth conditions. In five hundred years, all of Venus might be Paradise.

To Hollister it seemed like a long time to wait.

III.

He didn't need many days to catch on to the operations and be made boss of a construction gang. Then he took out twenty men and a train of supplies and machinery, to erect still another airmaker.

It was blowing hard then, too hard to set up the seal-tents which ordinarily provided a measure of comfort. Men rested in the tanks, side by side, dozing uneasily and smelling each other's sweat. They griped loudly, but endured. It was a lengthy trip to their site; eventually the whole camp was to be broken up and re-established in a better location, but meanwhile they had to accept the monotony of travel.

Hollister noticed that his men had evolved an Asian ability just to sit, without thinking, hour after hour. Their conversation and humour also suggested Asia: acrid, often brutal, though maintaining a careful surface politeness most of the time. It was probably more characteristic of this particular job than of the whole planet, though, and maybe they sloughed it off again when their hitches on air detail had expired and they got more congenial assignments.

As boss, he had the privilege of sharing his tank with only one man; he chose the wizened Johnny, whom he rather liked. Steering through a yelling

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sandstorm, he was now able to carry on a conversation—and it was about time, he reflected, that he got on with his real job.

"Ever thought of going back to Earth?" he asked casually.

"Back?" Johnny looked surprised. "I was born here."

"Well . . . going to Earth, then."

"What'd I use for passage money?"

"Distress clause of the Space Navigation Act. They'd have to give you a berth if you applied. Not that you couldn't repay your passage, with interest, in a while. With your experience here, you could get a fine post in one of the reclamation projects on Earth."

"Look," said Johnny in a flustered voice, "I'm a good Venusian. I'm needed here and I know it."

"Forget the Guardians," snapped Hollister, irritated. "I'm not going to report you. Why you people put up with a secret police anyway, is more than I can understand."

"You've got to keep people in line," said Johnny. "We all got to work together to make a go of it."

"But haven't you ever thought it'd be nice to decide your own future and not have somebody to tell you what to do next?"

"It ain't just 'somebody.' It's the Board. They know how you and me fit in best. Sure, I suppose there are subversives, but I'm not one of them."

"Why don't the malcontents just run away, if they don't dare apply for passage to Earth? They could steal materials and make their own village. Venus is a big place."

"It ain't that easy. And supposin' they could and did, what'd they do then? Just sit and wait for the Big Rain? We don't want any freeloaders on Venus, mister."

Hollister shrugged. There was something about the psychology that baffled him. "I'm not preaching revolution," he said carefully. "I came here of my own free will, remember. I'm just trying to understand the set-up."

Johnny's faded eyes were shrewd on him. "You've always had it easy compared to us, I guess. It may look hard to you here. But remember, we ain't never had it different, except that things are gettin' better little by little. The food ration gets upped every so often, and we're allowed a dress suit now as well as utility clothes, and before long there's goin' to be broadcast shows to the outposts—and some day the Big Rain is comin'. Then we can all afford to take it free and easy." He paused. "That's why we broke with Earth. Why should we slave our guts out to make a good life for our grandchildren, if a bunch of freeloaders are gonna come from Earth and fill up the planet then? It's *ours*. It's gonna be the richest planet men ever saw, and it belongs to us what developed it."

Official propaganda line, thought Hollister. It sounded plausible enough till you stopped to analyze. For one thing, each country still had the right to set its own immigration policies. Furthermore, at the rate Earth was progressing, with reclamation, population control, and new resources from the oceans, by the time Venus was ripe there wouldn't be any motive to leave home—an emigration which would be too long and expensive anyway. For their own

reasons, which he still had to discover, the rulers of Venus had not mentioned all the facts and had instead built up a paranoid attitude in their people.

The new airmaker site was the top of a ridge thrusting from a boulder-strewn plain. An eerie copper-colored light seemed to tinge the horizon with blood. A pair of bulldozers had already gone ahead and scooped out a walled hollow in which seal-tents could be erected; Hollister's gang swarmed from the tanks and got at that job. Then the real work began—blasting and carving a foundation, sinking piers, assembling the unit on top.

On the fourth day the rock storm came. It had dawned with an angry glow like sulfur, and as it progressed the wind strengthened and a dirty rack of clouds whipped low overhead. On the third shift, the gale was strong enough to lean against, and the sheet steel which made the unit's armour fought the men as if it lived.

The blond man, Sam Robbins, who had never liked Hollister, made his way up to the chief. His voice came over the helmet radio, dim beneath static and the drumming wind: "I don't like this. Better we take cover fast."

Hollister was not unwilling, but the delicate arc electrodes were being set up and he couldn't take them down again; nor could he leave them unprotected to the scouring drift of sand. "As soon as we get the shielding up," he said.

"I tell you, there's no time to shield 'em!"

"Yes, there is." Hollister turned his back. Robbins snarled something and returned to his labor.

A black wall, rust-red on the edges, was lifting to the east, the heaviest sand-storm Hollister had yet seen. He hunched his shoulders and struggled through the sleetlike dust to the unit. Tuning up his radio: "Everybody come help on this. The sooner it gets done, the sooner we can quit."

The helmeted figures swarmed around him, battling the thunderously flapping metal sheets, holding them down by main force while they were welded to the frame. Hollister saw lightning livid across the sky. Once a bolt flamed at the rod which protected the site. Thunder rolled and banged after it.

The wind slapped at them, and a sheet tore loose and went sailing down the hill. It struck a crag and wrapped itself around. "Robbins, Lewis, go get that!" cried Hollister, and returned attention to the piece he was clutching. An end ripped loose from his hands and tried to slash his suit.

The wind was so deafening that he couldn't hear it rise still higher, and in the murk of sand whirling about him he was nearly blind. But he caught the first glimpse of gale-borne gravel whipping past, and heard the terror in his earphones: "Rock storm!"

The voice shut up; orders were strict that the channel be kept clear. But the gasping men labored still more frantically, while struck metal rang and boomed.

Hollister peered through the darkness. "That's enough!" he decided. "Take cover!"

Nobody dropped his tools, but they all turned fast and groped down toward the camp. The way led past the crag, where Robbins and Lewis had just quit wrestling with the stubborn plate.

Hollister didn't see Lewis killed, but he did see him die. Suddenly his airsuit

was flayed open, and there was a spurt of blood, and he toppled. The wind took his body, rolling it out of sight in the dust. *A piece of rock, thought Hollister wildly. It tore his suit, and he's already embalmed—*

The storm hooted and squealed about him as he climbed the sand wall. Even the blown dust was audible, hissing against his helmet. He fumbled through utter blackness, fell over the top and into the comparative shelter of the camp ground. On hands and knees, he crawled toward the biggest of the self-sealing tents.

There was no time for niceties. They sacrificed the atmosphere within, letting the air lock stand open while they pushed inside. Had everybody made it to some tent or other? Hollister wasn't sure, but sand was coming in, filling the shelter. He went over and closed the lock. Somebody else started the pump, using bottled nitrogen to maintain air pressure and flush out the poisons. It seemed like a long time before the oxygen containers could be opened.

Hollister took off his helmet and looked around. The tent was half filled by seven white-faced men standing in the dust. The single fluorotube threw a cold light on their sweating bodies and barred the place with shadows. Outside, the wind bellowed.

"Might as well be comfortable," said Johnny in a small voice, and began shucking his airsuit. "If the tent goes, we're all done for anyhow." He sat down on the ground and checked his equipment methodically. Then he took a curved stone and spat on it and began scouring his faceplate to remove the accumulated scratches in its hard plastic. One by one the others imitated him.

"You there!"

Hollister looked up from his own suit. Sam Robbins stood before him. The man's eyes were red and his mouth worked.

"You killed Jim Lewis."

There was murder here. Hollister raised himself till he looked down at the Venusian. "I'm sorry he's dead," he replied, trying for quietness. "He was a good man. But these things will happen."

Robbins shuddered. "You sent him down there where the gravel got him. I was there, too. Was it meant for me?"

"Nobody could tell where that chunk was going to hit," said Hollister mildly. "I could just as easily have been killed."

"I *told* you to quit half an hour before the things started."

"We couldn't quit then without ruining all our work. Sit down, Robbins. You're overtired and scared."

The men were very still sitting and watching in the thick damp heat of the tent. Thunder crashed outside.

"You rotten Earthling—" Robbins' fist lashed out. It caught Hollister on the cheekbone and he stumbled back, shaking a dazed head. Robbins advanced grinning.

Hollister felt a cold viciousness of rage. It was his pseudopersonality he realized dimly but no time to think of that now. As Robbins closed in, he crouched and punched for the stomach.

Hard muscle met him. Robbins clipped him on the jaw. Hollister tried an uppercut, but it was skillfully blocked. This man knew how to fight.

Hollister gave him another fusillade in the belly. Robbins grunted and

rabbit-punched. Hollister caught it on his shoulder, reached up, grabbed an arm, and whirled his enemy over his head. Robbins hit a bunkframe that buckled under him.

He came back, dizzy but game. Hollister was well trained in combat. But it took him a good ten minutes to stretch his man bleeding on the ground.

Panting, he looked about him. There was no expression on the faces that ringed him in. "Anybody else?" he asked hoarsely.

"No, boss," said Johnny. "You're right, o' course. I don't think nobody else here wants twenty lashes back at base."

"Who said—" Hollister straightened, blinking. "Lashes?"

"Why, sure. This was mutiny, you know. It's gotta be punished."

Hollister shook his head. "Too barbaric. Correction—"

"Look, boss," said Johnny, "you're a good engineer but you don't seem to understand much about Venus yet. We ain't got the time or the manpower or the materials to spend on them there corrective jails. A bull what don't keep his nose clean gets the whip or the sweatbox, and then back to the job. The really hard cases go to the uranium mines at Lucifer." He shivered, even in the dense heat.

Hollister frowned. "Not a bad system," he said, to stay in character. "But I think Robbins here has had enough. I'm not going to report him if he behaves himself from now on, and I'll trust the rest of you to cooperate."

They mumbled assent. He wasn't sure whether they respected him for it or not, but the boss was boss. Privately, he suspected that the Boards must frame a lot of men, or at least sentence them arbitrarily for minor crimes, to keep the mines going; there didn't seem to be enough rebellion in the Venusian character to supply them otherwise.

Chalk up another point for the government. The score to settle was getting rather big.

IV.

Time was hard to estimate on Venus; it wasn't only that they had their own calendar here, but one day was so much like another. Insensibly and despite himself, Hollister began sliding into the intellectual lethargy of the camp. He had read the few books—and with his trained memory, he could only read a book once—and he knew every man there inside out, and he had no family in one of the cities to write to and think about. The job itself presented a daily challenge, no two situations were ever quite the same and occasionally he came near death, but outside of it there was a tendency to stagnate.

The other two engineers, Gebhardt and Yamashita, were pleasant company. The first was from Hörselberg, which had been a German settlement and still retained some character of its own, and he had interesting stories to tell of it;



the second, though of old Venus-American stock, was mentally agile for a colonist, had read more than most and had a lively interest in the larger world of the Solar System. But even the stimulation they offered wore a little thin in six months or so.

The region spun through a "winter" that was hardly different from summer except in having longer nights, and the sterile spring returned, and the work went on. Hollister's time sense ticked off days with an accuracy falling within a few seconds, and he wondered how long he would be kept here and when he would get a chance to report to his home office. That would be in letters ostensibly to friends, which one of the spaceships would carry back; he knew censors would read them first, but his code was keyed to an obscure eighteenth-century book he was certain no one on Venus had ever heard of.

Already he knew more about this planet than anyone on Earth. It had always been too expensive to send correspondents here, and the last couple of UN representatives hadn't found much to tell. The secretiveness toward Earthmen might be an old habit, going back to the ultra-nationalistic days of the last century. Colony A and Colony B, of two countries which at home might not be on speaking terms, were not supposed to give aid and comfort to each other; but on Venus such artificial barriers had to go if anyone was to survive. Yamashita told with relish how prospectors from Little Moscow and Trolen had worked together and divided up their finds. But of course, you couldn't let your nominal rulers know—

Hollister was beginning to realize that the essential ethos of Venus was, indeed, different from anything which existed on Earth. It had to be, the landscape had made it so. Man was necessarily a more collective creature than at home. That helped explain the evolution of the peculiar governmental forms and the patience of the citizenry toward the most outrageous demands. Even the dullest laborer seemed to live in the future.

Our children and grandchildren will build the temples, read the books, write the music. Ours is only to lay the foundation.

And was that why they stuck here, instead of shipping back and turning the whole job over to automatic machinery and a few paid volunteers? They had been the lonely, the rejected, the dwellers in outer darkness, for a long time; now they could not let go of their fierce and angry pride, even when there was no more need for it. Hollister thought about Ireland. Man is not a logical animal.

Still, there were features of Venusian society that struck him as unnecessary and menacing. Something would have to be done about them, though as yet he wasn't sure what it would be.

He worked, and he gathered impressions and filed them away, and he waited. And at last the orders came through. This camp had served its purpose, it was to be broken up and replanted elsewhere, but first its personnel were to report to New America and get a furlough. Hollister swung almost gaily into the work of dismantling everything portable and loading it in the wagons. Maybe he finally was going to get somewhere.

He reported at the Air Control office with Gebhardt and Yamashita, to get his pay and quarters assignment. The official handed him a small card. "You've been raised to chief engineer's rank," he said. "You'll probably get a camp of your own next time."

Gebhardt pounded him on the back. "*Ach, sehr gut!* I recommended you, boy, you did fine, but I am going to miss you."

"Oh . . . we'll both be around for a while, won't we?" asked Hollister uncomfortably.

"Not I! I haff wife and kids, I hop the next rocket to Hörselberg."

Yamashita had his own family in town, and Hollister didn't want to intrude too much on them. He wandered off, feeling rather lonesome.

His new rating entitled him to private quarters, a tiny room with minimal furniture, though he still had to wash and eat publicly like everyone else except the very top. He sat down in it and began composing the planned letters.

There was a knock on the door. He fumbled briefly, being used to scanners at home and not used to doors on Venus, and finally said: "Come in."

A woman entered. She was young, quite good-looking, with a supple tread and spectacularly red hair. Cool green eyes swept up and down his height. "My name is Barbara Brandon," she said. "Administrative assistant in Air Control."

"Oh . . . hello." He offered her the chair. "You're here on business?"

Amusement tinged her impersonal voice. "In a way. I'm going to marry you."

Hollister's jaw did not drop, but it tried. "Come again?" he asked weakly.

She sat down. "It's simple enough. I'm thirty-seven years old, which is almost the maximum permissible age of celibacy except in special cases." With a brief, unexpectedly feminine touch: "That's Venus years, of course! I've seen you around, and looked at your record; good heredity there, I think. Pops O.K.'d it genetically—that's Population Control—and the Guardians cleared it, too."

"Um-m-m . . . look here." Hollister wished there were room to pace. He settled for sitting on the table and swinging his legs. "Don't I get any say in the matter?"

"You can file any objections, of course, and probably they'd be heeded; but you'll have to have children by someone pretty soon. We need them. Frankly, I think a match between us would be ideal. You'll be out in the field so much that we won't get in each other's hair, and we'd probably get along well enough while we are together."

Hollister scowled. It wasn't the morality of it—much. He was a bachelor on Earth, secret service Un-men really had no business getting married; and in any case the law would wink at what he had done on Venus if he ever got home. But something about the whole approach annoyed him.

"I can't see where you need rules to make people breed," he said coldly. "They'll do that anyway. You don't realize what a struggle it is on Earth to bring the population back down toward a sensible figure."

"Things are different here," answered Barbara Brandon in a dry tone. "We're going to need plenty of people for a long time to come, and they have to be of the right stock. The congenitally handicapped can't produce enough to justify their own existence; there's been a program of euthanasia there, as you may know. But the new people are also needed in the right places. This town, for instance, can only accommodate so much population increase per year. We can't send surplus children off to a special crèche because there aren't enough teachers or doctors or anything, so the mothers have to take care of all their own kids; or the fathers, if they happen to have a job in town and the mother is a field worker. The whole process has *got* to be regulated."

"Regulations!" Hollister threw up his hands. "Behold the bold frontiersman!"

The girl looked worried. "Careful what you say." She smiled at him with a touch of wistfulness. "It needn't be such a hindrance to you. Things are . . . pretty free except where the production of children is involved."

"I—This is kind of sudden." Hollister tried to smile back. "Don't think I don't appreciate the compliment. But I need time to think, adjust myself—Look, are you busy right now?"

"No, I'm off."

"All right. Put on your party clothes and we'll go out and have some drinks and talk the matter over."

She glanced shyly at the thin, colored coverall she wore. "These are my party clothes," she said.

Hollister's present rank let him visit another bar than the long, crowded room where plain laborers caroused. This one had private tables, decorations, music in the dim dusky air. It was quiet, the engineer aristocracy had their own code of manners. A few couples danced on a small floor.

He found an unoccupied table by the curving wall, sat down, and dialed for drinks and cigarettes. Neither were good enough to justify their fantastic cost, but it had been a long time since he had enjoyed any luxuries at all. He felt more relaxed with them. The girl looked quite beautiful in the muted light.

"You were born here, weren't you, Barbara?" he asked after a while.

"Of course," she said. "You're the first immigrant in a long time. Used to be some deportees coming in every once in a while, but—"

"I know. 'Sentence suspended on condition you leave Earth.' That was before all countries had adopted the new penal code. Never mind. I was just wondering if you wouldn't like to see Earth—sometime."

"Maybe. But I'm needed here, not there. And I like it." There was a hint of defiance in the last remark.

He didn't press her. The luminous murals showed a soft unreal landscape of lakes and forests, artificial stars twinkled gently in the ceiling. "Is this what you expect Venus to become?" he asked.

"Something like this. Probably not the stars, it'll always be cloudy here, but they'll be honest rain clouds. We should live to see the beginning of it."

"Barbara," he asked, "do you believe in God?"

"Why, no. Some of the men are priests and rabbis and whatnot in their spare time, but—No, not I. What about it?"

"You're wrong," he said. "Venus is your god. This is a religious movement you have here, with a slide rule in its hand."

"So—?" She seemed less assured, he had her off balance and the green eyes were wide and a little frightened.

"An Old Testament god," he pursued, "merciless, all-powerful, all-demanding. Get hold of a Bible if you can, and read Job and Ecclesiastes. You'll see what I mean. When is the New Testament coming . . . or even the prophet Micah?"

"You're a funny one," she said uncertainly. Frowning, trying to answer him on his own terms: "After the Big Rain, things will be easier. It'll be—" She struggled through vague memories. "It'll be the Promised Land."

"You've only got this one life," he said. "Is there any sound reason for spending it locked in these iron boxes, with death outside, when you could lie on a beach on Earth and everything you're fighting for is already there?"

She grabbed his hand where it lay on the table. Her fingers were cold, and she breathed fast. "No! Don't say such things! You're here too. You came here—"

Get thee behind me, Satan.

"Sorry." He lifted his glass. "Here's freefalling."

She clinked with him smiling shakily.

"There isn't any retirement on Venus, is there?" he asked.

"Not exactly. Old people get lighter work, of course. When you get too old to do anything . . . well, wouldn't you want euthanasia?"

He nodded, quite sincerely, though his exact meaning had gone by her. "I was just thinking of . . . shall we say us . . . rose-covered cottages, sunset of life. Darby and Joan stuff."

She smiled, and reached over to stroke his cheek lightly. "Thanks," she murmured. "Maybe there will be rose-covered cottages by the time we're that old."

Hollister turned suddenly, aware with his peripheral senses of the man who approached. Or maybe it was the sudden choking off of low-voiced conversation in the bar. The man walked very softly up to their table and stood looking down on them. Then he pulled out the extra chair for himself.

"Hello, Karsov," said Hollister dully.

The Guardian nodded. There was a ghostly smile playing about his lips. "How are you?" he asked, with an air of not expecting a reply. "I am glad you did so well out there. Your chief recommended you very highly."

"Thanks," said Hollister, not hiding the chill in his voice. He didn't like the tension he could see in Barbara.

"I just happened by and thought you would like to know you will have a crew of your own next trip," said the policeman. "That is, the Air Control office has made a recommendation to me." He glanced archly at Barbara. "Did you by any chance have something to do with that, Miss Brandon? Could be!" Then his eyes fell to the cigarettes, and he regarded them pointedly till Barbara offered him one.

"Pardon me." Hollister held his temper with an effort and kept his voice urbane. "I'm still new here, lot of things I don't know. Why does your office have to pass on such a matter?"

"My office has to pass on everything," said Karsov.

"Seems like a purely technical business as long as my own record is clean."

Karsov shook his sleek head. "You do not understand. We cannot have someone in a responsible position who is not entirely trustworthy. It is more than a matter of abstaining from criminal acts. You have to be with us all the way. No reservations. That is what Psych Control and the Guardians exist for."

He blew smoke through his nose and went on in a casual tone: "I must say your attitude has not been entirely pleasing. You have made some remarks which could be . . . misconstrued. I am ready to allow for your not being used to Venusian conditions, but you know the law about sedition."

For a moment, Hollister savored the thought of Karsov's throat between his fingers. "I'm sorry," he said.

"Remember, there are recorders everywhere, and we make spot checks directly on people, too. You could be narcoquizzed again any time I ordered

it. But I do not think that will be necessary just yet. A certain amount of grumbling is only natural, and if you have any genuine complaints you can file them with your local Technic Board."

Hollister weighed the factors in his mind. Karsov packed a gun, and—But too sudden a meekness could be no less suspicious. "I don't quite understand why you have to have a political police," he ventured. "It seems like an ordinary force should be enough. After all . . . where would an insurrectionist go?"

He heard Barbara's tiny gasp, but Karsov merely looked patient. "There are many factors involved," said the Guardian. "For instance, some of the colonies were not quite happy with the idea of being incorporated into the Venusian Federation. They preferred to stay with their mother countries, or even to be independent. Some fighting ensued, and they must still be watched. Then, too, it is best to keep Venusian society healthy while it is new and vulnerable to subversive radical ideas. And finally, the Guardian Corps is the nucleus of our future army and space navy."

Hollister wondered if he should ask why Venus needed military forces, but decided against it. The answer would only be some stock phrase about terrestrial imperialists, if he got any answer at all. He'd gone about far enough already.

"I see," he said. "Thanks for telling me."

"Would you like a drink, sir?" asked Barbara timidly.

"No," said Karsov. "I only stopped in on my way elsewhere. Work, always work." He got up. "I think you are making a pretty good adjustment, Hollister. Just watch your tongue . . . and your mind. Oh, by the way. Under the circumstances, it would be as well if you did not write any letters home for a while. That could be misunderstood. You may use one of the standard messages. They are much cheaper, too." He nodded and left.

Hollister's eyes followed him out. *How much does he know?*

"Come on," said Barbara. There was a little catch in her voice. "Let's dance."

Gradually they relaxed, easing into the rhythm of the music. Hollister dismissed the problem of Karsov for the time being, and bent mind and senses to his companion. She was lithe and slim in his arms, and he felt the stirrings of an old hunger in him.

The next Venus day he called on Yamashita. They had a pleasant time together, and arranged a party for later; Hollister would bring Barbara. But as he was leaving, the Venusian drew him aside.

"Be careful, Si," he whispered. "They were here a few hours after I got back, asking me up and down about you. I had to tell the truth, they know how to ask questions and if I'd hesitated too much it would have been narco. I don't think you're in any trouble, but be careful!"

Barbara had arranged her vacation to coincide with his—efficient girl! They were together most of the time. It wasn't many days before they were married. That was rushing things, but Hollister would soon be back in the field for a long stretch and—well—they had fallen in love. Under the circumstances, it was inevitable. Curious how it broke down the girl's cool self-possession, but that only made her more human and desirable.

He felt like a thorough skunk, but maybe she was right. *Carpe diem*. If he ever pulled out of this mess, he'd just have to pull her out with him; mean-

while, he accepted the additional complication of his assignment. It looked as if that would drag on for years, anyhow; maybe a lifetime.

They blew themselves to a short honeymoon at a high-class—and expensive—resort by Thunder Gorge, one of Venus' few natural beauty spots. The atmosphere at the lodge was relaxed, congenial, not a Guardian in sight and more privacy than elsewhere on the planet. Psych Control was shrewd enough to realize that people needed an occasional surcease from all duty, some flight from the real world of sand and stone and steel. It helped keep them sane.

Even so, there was a rather high proportion of mental disease. It was a taboo subject, but Hollister got a doctor drunk and wormed the facts out of him. The psychotic were not sent back to Earth, as they could have been at no charge; they might talk too much. Nor were there facilities for proper treatment on Venus. If the most drastic procedures didn't restore a patient to some degree of usefulness in a short time—they had even revived the barbarism of prefrontal lobotomy!—he was quietly gassed.

"But it'll all be diff'rent af'er uh Big Rain," said the doctor. "My son ull have uh real clinic, he will."

More and more, Hollister doubted it.

A few sweet crazy days, and vacation's end was there and they took the rocket back to New America. It was the first time Hollister had seen Barbara cry.

He left her sitting forlornly in the little two-room apartment they now rated, gathering herself to arrange the small heap of their personal possessions, and reported to Air Control. The assistant super gave him a thick bound sheaf of papers.

"Here are the orders and specs," he said. "You can have two days to study them." Hollister, who could memorize the lot in a few hours, felt a leap of gladness at the thought of so much free time. The official leaned back in his chair. He was a gnarled old man, retired to a desk after a lifetime of field duty. One cheek was puckered with the scars of an operation for the prevalent HR cancer; Venus had no germs, but prepared her own special death traps. "Relax for a minute and I'll give you the general idea."

He pointed to a large map on the wall. It was not very complete or highly accurate: surveying on this planet was a job to break a man's heart, and little had been done. "We're establishing your new camp out by Last Chance. You'll note that Little Moscow, Trollen, and Roger's Landing cluster around it at an average distance of two hundred kilometers, so that's where you'll be getting your supplies, sending men on leave, and so forth. I doubt if you'll have any occasion to report back here till you break camp completely in a couple of years."

And Barbara will be here alone, Barbara and our child whom I won't even see—

"You'll take your wagon train more or less along this route," went on the super, indicating a dotted line that ran from New America. "It's been gone over and is safe. Notice the eastward jog to Lucifer at the halfway point. That's to refuel and take on fresh food stores."

Hollister frowned, striving for concentration on the job. "I can't see that. Why not take a few extra wagons and omit the detour?"

"Orders," said the super.

Whose orders? Karsov's, I'll bet my air helmet!—but why?

"Your crew will be . . . kind of tough," said the old man. "They're mostly

from Ciudad Alcazar, which is on the other side of the world. It was one of the stubborn colonies when we declared independence, had to be put down by force, and it's still full of sedition. These spigs are all hard cases who've been

assigned to this hemisphere so they won't stir up trouble at home. I saw in your dossier that you speak Spanish, among other languages, which is one reason you're being given this bunch. You'll have to treat them rough, remember. Keep them in line."

I think there was more than one reason behind this.

"The details are all in your assignment book," said the super. "Report back here in two days, this time. O.K.—have fun!" He smiled, suddenly friendly now that his business was completed.

V.

Darkness and a whirl of poison sleet turned the buildings into crouching black monsters, hardly to be told from the ragged snarl of crags which ringed them in. Hollister brought his tank to a grinding halt before a tower which fixed him with a dazzling floodlight eye. "Sit tight, Diego," he said, and slapped his helmet down.

His chief assistant, Fernandez, nodded a sullen dark head. He was competent enough, and had helped keep the unruly crew behaving itself, but remained cold toward his boss. There was always a secret scorn in his eyes.

Hollister wriggled through the air lock and dropped to the ground. A man in a reinforced, armorlike suit held a tommy-gun on him, but dropped the muzzle as he advanced. The blast of white light showed a stupid face set in lines of habitual brutality.



"You the airman come for supplies?" he asked.

"Yes. Can I see your chief?"

The guard turned wordlessly and led the way. Beyond the lock of the main shell was a room where men sat with rifles. Hollister was escorted to an inner office, where a middle-aged, rather mild-looking fellow in Guardian uniform greeted him. "How do you do? We had word you were coming. The supplies were brought to our warehouse and you can load them when you wish."

Hollister accepted a chair. "I'm Captain Thomas," the other continued. "Nice to have you. We don't see many new faces at Lucifer—not men you can talk to, anyway. How are things at New America?"

He gossiped politely for a while. "It's quite a remarkable installation we have here," he ended. "Would you like to see it?"

Hollister grimaced. "No, thanks."

"Oh, I really must insist. You and your chief assistant and one or two of the foremen. They'll all be interested, and can tell the rest of your gang how it is. There's so little to talk about in camp."

Hollister debated refusing outright and forcing Thomas to show his hand. But why bother? Karsov had given orders, and Thomas would conduct him around at gun point if necessary. "O.K., thanks," he said coldly. "Let me get my men bunked down first, though."

"Of course. We have a spare barracks for transients. I'll expect you in two hours . . . with three of your men, remember."

Diego Fernandez only nodded when Hollister gave him the news. The chief skinned his teeth in a bleak sort of grin. "Don't forget to 'oh' and 'ah,'" he said. "Our genial host will be disappointed if you don't, and he's a man I'd hate to disappoint."

The smoldering eyes watched him with a quizzical expression that faded back into blankness. "I shall get Gomez and San Rafael," said Fernandez. "They have strong stomachs."

Thomas received them almost unctuously and started walking down a series of compartments. "As engineers, you will be most interested in the mine itself," he said. "I'll show you a little of it. This is the biggest uranium deposit known in the Solar System."

He led them to the great cell block, where a guard with a shock gun fell in behind them. "Have to be careful," said Thomas. "We've got some pretty desperate characters here, who don't feel they have much to lose."

"All lifers, eh?" asked Hollister.

Thomas looked surprised. "Of course! We couldn't let them go back after what the radiation does to their germ plasm."

A man rattled the bars of his door as they passed. "I'm from New America!" His harsh scream bounded between steel walls. "Do you know my wife? Is Martha Riley all right?"

"Shut up!" snapped the guard, and fed him a shock beam. He lurched back into the darkness of his cell. His mate, whose face was disfigured by a cancer, eased him to his bunk.

Someone else yelled, far down the long white-lit rows. A guard came running from that end. The voice pleaded: "It's a nightmare. It's just a nightmare. The stuff's got intuh muh brain and I'm always dreamin' nightmares—"

"They get twitchy after a while," said Thomas. "Stuff will seep through the

suits and lodge in their bodies. Then they're not much good for anything but pick-and-shovel work. Don't be afraid, gentlemen, we have reinforced suits for the visitors and guards."

These were donned at the end of the cell block. Beyond the double door, a catwalk climbed steeply, till they were on the edge of an excavation which stretched farther than they could see in the gloom.

"It's rich enough yet for open pit mining," said Thomas, "though we're driving tunnels, too." He pointed to a giant scooper. Tiny shapes of convicts scurried about it. "Four-hour shifts because of the radiation down there. Don't believe those rumors that we aren't careful with our boys. Some of them live for thirty years."

Hollister's throat felt cottony. It would be so easy to rip off Thomas' air hose and kick him down into the pit! "What about women prisoners?" he asked slowly. "You must get some."

"Oh, yes. Right down there with the men. We believe in equality on Venus."

There was a strangled sound in the earphones, but Hollister wasn't sure which of his men had made it.

"Very essential work here," said Thomas proudly. "We refine the ore right on the spot too, you know. It not only supplies such nuclear power as Venus needs, but exported to Earth it buys the things we still have to have from them."

"Why operate it with convict labor?" asked Hollister absently. His imagination was wistfully concentrated on the image of himself branding his initials on Thomas' anatomy. "You could use free men, taking proper precautions, and it would be a lot more efficient and economical of manpower."

"You don't understand." Thomas seemed a bit shocked. "These are enemies of the state."

I've read that line in the history books. Some state, if it makes itself that many enemies!

"The refinery won't interest you so much," said Thomas. "Standard procedure, and it's operated by nonpolitical prisoners under shielding. They get skilled, and become too valuable to lose. But no matter who a man is, how clever he is, if he's been convicted of treason he goes to the mine."

So this was a warning—or was it a provocation?

When they were back in the office, Thomas smiled genially. "I hope you gentlemen have enjoyed the tour," he said. "Do stop in and see me again sometime." He held out his hand. Hollister turned on his heel, ignoring the gesture, and walked out.

Even in the line of duty, a man can only do so much.

Somewhat surprisingly Hollister found himself getting a little more popular with his crew after the visit to Lucifer. The three who were with him must have seen his disgust and told about it. He exerted himself to win more of their friendship, without being too obtrusive about it: addressing them politely, lending a hand himself in the task of setting up camp, listening carefully to complaints about not feeling well instead of dismissing them all as malingering. That led to some trouble. One laborer who was obviously faking a stomach-ache was ordered back to the job and made an insulting crack. Hollister knocked him to the floor with a single blow. Looking around at the others present, he said slowly: "There will be no whippings in this camp, because I do not believe

men should be treated thus. But I intend to remain chief and to get this business done." Nudging the fallen man with his foot: "Well, go on back to your work. This is forgotten also in the records I am supposed to keep."

He didn't feel proud of himself—the man had been smaller and weaker than he. But he had to have discipline, and the Venusians all seemed brutalized to a point where the only unanswerable argument was force. It was an inevitable consequence of their type of government, and boded ill for the future.

Somewhat later, his radio-electronics technic, Valdez—a soft-spoken little fellow who did not seem to have any friends in camp—found occasion to speak with him. "It seems that you have unusual ideas about running this operation, señor," he remarked.

"I'm supposed to get the airmakers installed," said Hollister. "That part of it is right on schedule."

"I mean with regard to your treatment of the men, señor. You are the mildest chief they have had. I wish to say that it is appreciated, but some of them are puzzled. If I may give you some advice, which is doubtless not needed, it would be best if they knew exactly what to expect."

Hollister felt bemused. "Fairness, as long as they do their work. What is so strange about that?"

"But some of us . . . them . . . have unorthodox ideas about politics."

"That is their affair, Señor Valdez." Hollister decided to make himself a little more human in the technic's eyes. "I have a few ideas of my own, too."

"Ah, so. Then you will permit free discussion in the barracks?"

"Of course."

"I have hidden the recorder in there very well. Do you wish to hear the tapes daily, or shall I just make a summary?"

"I don't want to hear any tapes," stated Hollister. "That machine will not be operated."

"But they might plan treason!"

Hollister laughed and swept his hand around the wall. "In the middle of *that*? Much good may their plans do them!" Gently: "All of you may say what you will among yourselves. I am an engineer, not a secret policeman."

"I see, señor. You are very generous. Believe me, it is appreciated."

Three days later, Valdez was dead.

Hollister had sent him out with a crew to run some performance tests on the first of the new airmakers. The men came back agitatedly, to report that a short, sudden rock storm had killed the technic. Hollister frowned, to cover his pity for the poor lonely little guy. "Where is the body?" he asked.

"Out there, señor—where else?"

Hollister knew it was the usual practice to leave men who died in the field where they fell; after Venusian conditions had done their work, it wasn't worthwhile salvaging the corpse for its chemicals. But—"Have I not announced my policy?" he snapped. "I thought that you people, of all, would be glad of it. Dead men will be kept here, so we can haul them into town and have them properly buried. Does not your religion demand that?"

"But Valdez, señor—"

"Never mind! Back you go, at once, and this time bring him in." Hollister turned his attention to the problem of filling the vacancy. Control wasn't

going to like him asking for another so soon; probably he couldn't get one anyway. Well, he could train Fernandez to handle the routine parts, and do the more exacting things himself.

He was sitting in his room that night, feeling acutely the isolation of a commander—too tired to add another page to his letter to Barbara, not tired enough to go to sleep. There was a knock on the door. His start told him how thin his nerves were worn. "Come in!"

Diego Fernandez entered. The chill white fluorolight showed fear in his eyes and along his mouth. "Good evening, Simón," he said tonelessly. They had gotten to the stage of first names, though they still addressed each other with the formal pronoun.

"Good evening, Diego. What is it?"

The other bit his lip and looked at the floor. Hollister did not try to hurry him. Outside the wind was running and great jags of lightning sizzled across an angry sky, but this room was buried deep and very quiet.

Fernandez's eyes rose at last. "There is something you ought to know, Simón. Perhaps you already know it."

"And perhaps not, Diego. Say what you will. There are no recorders here."

"Well, then, Valdez was not accidentally killed. He was murdered."

Hollister sat utterly still.

"You did not look at the body very closely, did you?" went on Fernandez, word by careful word. "I have seen suits torn open by flying rocks. This was not such a one. Some instrument did it . . . a compressed-air drill, I think."

"And do you know why it was done?"

"Yes." Fernandez's face twisted. "I cannot say it was not a good deed. Valdez was a spy for the government."

Hollister felt a knot in his stomach. "How do you know this?"

"One can be sure of such things. After the . . . the Venusians had taken Alcazar, Valdez worked eagerly with their police. He had always believed in confederation and planetary independence. Then he went away, to some engineering assignment it was said. But he had a brother who was proud of the old *hidalgo* blood, and this brother sought to clear the shame of his family by warning that Valdez had taken a position with the Guardians. He told it secretly, for he was not supposed to, but most of Alcazar got to know it. Then men who had fought against the invaders were sent here, to the other side of the world, and it is not often we get leave to go home even for a short while. But we remembered, and we knew Valdez when he appeared on this job. So when those men with him had a chance to revenge themselves, they took it."

Hollister fixed the brown eyes with his own. "Why do you tell me this?" he asked.

"I do not—quite know. Except that you have been a good chief. It would be best for us if we could keep you, and this may mean trouble for you."

I'll say! First I practically told Valdez how I feel about the government, then he must have transmitted it with the last radio report, and now he's dead. Hollister chose his words cautiously: "Have you thought that the best way I can save myself is to denounce those men?"

"They would go to Lucifer, Simón."

"I know." He weighed the factors, surprised at his own detached calm. On the one hand there were Barbara and himself, and his own mission; on

the other hand were half a dozen men who would prove most valuable come the day—for it was becoming more and more clear that the sovereign state of Venus would have to be knocked down, the sooner the better.

Beyond a small ache, he did not consider the personal element; Un-man training was too strong in him for that. A melody skipped through his head. "*Here's a how-de-do*—" It was more than a few men, he decided; this whole crew, all fifty or so, had possibilities. A calculated risk was in order.

"I did not hear anything you said," he spoke aloud. "Nor did you ever have any suspicions. It is obvious that Valdez died accidentally—too obvious to question."

Fernandez's smile flashed through the sweat that covered his face. "Thank you, Simón!"

"Thanks to you, Diego." Hollister gave him a drink—the boss was allowed a few bottles—and sent him on his way.

The boss was also allowed a .45 magnum automatic, the only gun in camp. Hollister took it out and checked it carefully. What was that classic verdict of a coroner's jury, a century or more ago in the States? "An act of God under very suspicious circumstances." He grinned to himself. It was not a pleasant expression.

VI.

The rocket landed three days later. Hollister, who had been told by radio to expect it but not told why, was waiting outside. A landing space had been smoothed off and marked, and he had his men standing by and the tanks and bulldozers parked close to hand. Ostensibly that was to give any help which might be needed; actually, he hoped they would mix in on his side if trouble started. Power-driven sand blasts and arc welders were potentially nasty weapons, and tanks and 'dozers could substitute for armored vehicles in a pinch. The gun hung at his waist.

There was a mild breeze, for Venus, but it drove a steady scud of sand across the broken plain. The angry storm-colored light was diffused by airborne dust till it seemed to pervade the land, and even through his helmet and earphones Hollister was aware of the wind-yammer and the remote banging of thunder.

A new racket grew in heaven, stabbing jets and then the downward hurtle of sleek metal. The rocket's glider wings were fully extended, braking her against the updraft, and the pilot shot brief blasts to control his yawning vessel and bring her down on the markings. Wheels struck the hard-packed sand, throwing up a wave of it; landing flaps strained, a short burst from the nose jet arched its back against the flier's momentum, and then the machine lay still.

Hollister walked up to it. Even with the small quick-type air lock, he had to wait a couple of minutes before two suited figures emerged. One was obviously the pilot; the other—

"Barbara!"

Her face had grown thin, he saw through the helmet plate, and the red hair was disordered. He pulled her to him, and felt his faceplate clank on hers. "Barbara! What brings you here? Is everything all right?"

She tried to smile. "Not so public. Let's get inside."

The pilot stayed, to direct the unloading of what little equipment had been

packed along; a trip was never wasted. Fernandez could do the honors afterward. Hollister led his wife to his own room, and no words were said for a while.

Her lips and hands felt cold.

"What is it, Barbara?" he asked when he finally came up for air. "How do we rate this?"

She didn't quite meet his eyes. "Simple enough. We're not going to have a baby after all. Since you'll be in the field for a long time, and I'm required to be a mother soon, it . . . it wasn't so hard to arrange a leave for me. I'll be here for ten days."

That was almost an Earth month. The luxury was unheard-of. Hollister sat down on his bunk and began to think.

"What's the matter?" She rumbled his hair. "Aren't you glad to see me? Maybe you have a girl lined up in Trollden?"

Her tone wasn't quite right, somehow. In many ways she was still a stranger to him, but he knew she wouldn't banter him with just that inflection. Or did she really think—"I'd no such intention," he said.

"Of course not, you jethead! I trust you." Barbara stretched herself luxuriously. "Isn't this wonderful?"

Yeah . . . too wonderful. "Why do we get it?"

"I told you." She looked surprised. "We've got to have a child."

He said grimly, "I can't see that it's so all-fired urgent. If it were, it's be easier, and right in line with the Board's way of thinking, to use artificial insemination." He stood up and gripped her shoulders and looked straight at her. "Barbara, why are you really here?"

She began to cry, and that wasn't like her either. He patted her and mumbled awkward phrases, feeling himself a louse. But something was very definitely wrong, and he had to find out what.

He almost lost his resolution as the day went on. He had to be outside most of that time, supervising and helping; he noticed that several of the men had again become frigid to him. Was that Karsov's idea—to drive a wedge between him and his crew by giving him an unheard-of privilege? Well, maybe partly, but it could not be the whole answer. When he came back, Barbara had unpacked and somehow, with a few small touches, turned his bleak little bedroom-office into a home. She was altogether gay and charming and full of hope.

The rocket had left, the camp slept, they had killed a bottle to celebrate and now they were alone in darkness. In such a moment of wonder, it was hard to keep a guard up.

"Maybe you appreciate the Board a little more," she sighed. "They aren't machines. They're human, and know that we are too."

"'Human' is a pretty broad term," he murmured, almost automatically. "The guards at Lucifer are human, I suppose."

Her hand stole out to stroke his cheek. "Things aren't perfect on Venus," she said. "Nobody claims they are. But after the Big Rain—"

"Yeah. The carrot in front and the stick behind, and on the burro trots. He doesn't stop to ask where the road is leading. I could show it by psychodynamic equations, but even an elementary reading of history is enough: once a group gets power, it *never* gives it up freely."

"There was Kemal Atatürk, back around 1920, wasn't there?"

"Uh-huh. A very exceptional case: the hard-boiled, practical man who was still an idealist, and built his structure so well that his successors—who'd grown up under him—neither could nor wanted to continue dictatorship. It's an example which the UN Inspectorate on Earth has studied closely and tried to adapt, so that its own power won't some day be abused.

"The government of Venus just isn't that sort. Their tactics prove it. Venus has to be collective till the Big Rain, I suppose, but that doesn't give anyone the right to collectivize the minds of men. By the time this hell-hole is fit for human life, the government will be unshakeably in the saddle. Basic principle of psychobiology: survival with least effort. In human society, one of the easiest ways to survive and grow fat is to rule your fellow men.

"It's significant that you've learned about Atatürk. How much have they told you about the Soviet Union? The state was supposed to wither away there, too."

"Would you actually . . . conspire to revolt?" she asked.

He slammed the brakes so hard that his body jerked. *Danger! Danger! Danger! How did I get into this? What am I saying? Why is she asking me?* With a single bound, he was out of bed and had snapped on the light.

Its glare hurt his eyes, and Barbara covered her face. He drew her hands away, gently but using his strength against her resistance. The face that looked up at him was queerly distorted; the lines were still there, but they had become something not quite human.

"Who put you up to this?" he demanded.

"No one . . . what are you talking about, what's wrong?"

"The perfect spy," he said bitterly. "A man's own wife."

"What do you mean?" She sat up, staring wildly through her tousled hair.

"Have you gone crazy?"

"*Could you be a spy?*"

"I'm not," she gasped. "I swear I'm not."

"I didn't ask if you were. What I want to know is could you be a spy?"

"I'm not. It's impossible. I'm not—" She was screaming now, but the thick walls would muffle that.

"Karsov is going to send me to Lucifer," he flung at her. "Isn't he?"

"I'm not, I'm not, I'm not—"

He stabbed the questions at her, one after another, slapping when she got hysterical. The first two times she fainted, he brought her around again and continued; the third time, he called it off and stood looking down on her.

There was no fear or rage left in him, not even pity. He felt strangely empty. There seemed to be a hollowness inside his skull, the hollow man went through the motions of life and his brain still clicked rustily, but there was nothing inside, he was a machine.

The perfect spy, he thought. Except that Karsov didn't realize Un-men have advanced psych training. I know such a state as hers when I see it.

The work had been cleverly done, using the same drugs and machines and conditioning techniques which had given him his own personality mask. (No—not quite the same. The Venusians didn't know that a mind could be so deeply verbal-conditioned as to get by a narcoquiz; that was a guarded secret of the

Inspectorate. But the principles were there.) Barbara did not remember being taken to the laboratories and given the treatment. She did not know she had been conditioned; consciously, she believed everything she had said, and it had been anguish when the man she loved turned on her.

But the command had been planted, to draw his real thoughts out of him. almost, she had succeeded. And when she went back, a quiz would get her observations out of her in detail.

It would have worked, too, on an ordinary conspirator. Even if he had come to suspect the truth, an untrained man wouldn't have known just how to throw her conscious and subconscious minds into conflict, wouldn't have recognized her symptomatic reactions for what they were.

This tears it, thought Hollister. This rips it wide open. He didn't have the specialized equipment to mask Barbara's mind and send her back with a lie that could get past the Guardian psychotechniques. Already she knew enough to give strong confirmation to Karsov's suspicions. After he had her account, Hollister would be arrested and they'd try to wring his secrets out of him. That might or might not be possible, but there wouldn't be anything left of Hollister.

Not sending her back at all? No, it would be every bit as much of a giveaway, and sacrifice her own life to boot. Not that she might not go to Lucifer anyhow.

Well—

The first thing was to remove her conditioning. He could do that in a couple of days by simple hypnotherapy. The medicine chest held some drugs which would be useful. After that—

First things first. Diego can take charge for me while I'm doing it. Let the men think what they want. They're going to have plenty to think about soon.

He became aware of his surroundings again and of the slim form beneath his eyes. She had curled up in a fetal position, trying to escape. Emotions came back to him, and the first was an enormous compassion for her. He would have wept, but there wasn't time.

Barbara sat up in bed, leaning against his breast. "Yes," she said tonelessly. "I remember it all now."

"There was a child coming, wasn't there?"

"Of course. They . . . removed it." Her hand sought his. "You might have suspected something otherwise. I'm all right, though. We can have another one sometime, if we live that long."

"And did Karsov tell you what he thought about me?"

"He mentioned suspecting you were an Un-man, but not being sure. The Technic Board wouldn't let him have you unless he had good evidence. That—No, I don't remember any more. It's fuzzy in my mind, everything which happened in that room."

Hollister wondered how he had betrayed himself. Probably he hadn't; his grumblings had fitted in with his assumed personality, and there had been no overt acts. But still, it was Karsov's job to suspect everybody, and the death of Valdez must have decided him on drastic action.

"Do you feel all right, sweetheart?" asked Hollister.

She nodded, and turned around to give him a tiny smile. "Yes. Fine. A little weak, maybe, but otherwise fine. Only I'm scared."

"You have a right to be," he said bleakly. "We're in a devil of a fix."

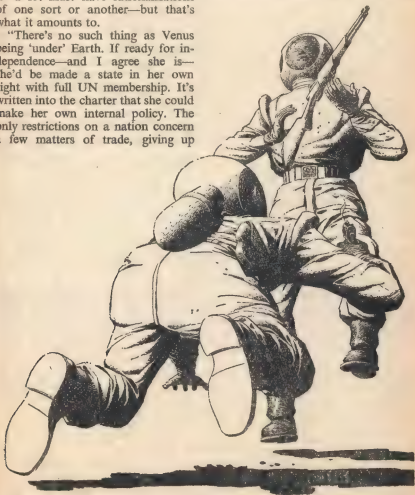
"You *are* an Un-man, aren't you?"

"Yes. I was sent to study the Venusian situation. My chiefs were worried about it. Seems they were justified, too. I've never seen a nastier mess."

"I suppose you're right," she sighed. "Only what else could we do? Do you want to bring Venus back under Earth?"

"That's a lot of comet gas, and you'd know it if the nationalist gang hadn't been censoring the books and spewing their lies out since before you were born. This whole independence movement was obviously their work from the beginning, and I must say they've done a competent job; good psychotechnics among them. It's their way to power. Not that all of them are so cynical about it—a lot must have rationalizations of one sort or another—but that's what it amounts to.

"There's no such thing as Venus being 'under' Earth. If ready for independence—and I agree she is—she'd be made a state in her own right with full UN membership. It's written into the charter that she could make her own internal policy. The only restrictions on a nation concern a few matters of trade, giving up



military forces and the right to make war, guaranteeing certain basic liberties, submitting to inspection, and paying her share of UN expenses—which are smaller than the cost of even the smallest army. That's all. Your nationalists have distorted the truth as their breed always does."

She rubbed her forehead in a puzzled way. He could sympathize: a lifetime of propaganda wasn't thrown off overnight. But as long as she was with his cause, the rest would come of itself.

"There's no excuse whatsoever for this tyranny you live under," he continued. "It's got to go."

"What would you have us do?" she asked. "This isn't Earth. We do things efficiently here, or we die."

"True. But even men under the worst conditions can afford the slight inefficiency of freedom. It's not my business to write a constitution for Venus, but you might look at how Mars operates. They also have to have requirements of professional competence for public schools—deadwood gets flunked out fast enough—and the graduates have to stand for election if they want policy-making posts. Periodic elections do not necessarily pick better men than an appointive system, but they keep power from concentrating in the leaders. The Martians also have to ration a lot of things, and forbid certain actions that would endanger a whole city, but they're free to choose their own residences, and families, and ways of thinking, and jobs. They're also trying to reclaim the whole planet, but they don't assign men to that work, they hire them for it."

"Why doesn't everyone just stay at home and do nothing?" she asked innocently.

"No work, no pay; no pay, nothing to eat. It's as simple as that. And when jobs are open in the field, and all the jobs in town are filled, men will take work in the field—as free men, free to quit if they wish. Not many do, because the bosses aren't little commissars.

"Don't you see, it's the *mass* that society has to regulate; a government has to set things up so that the statistics come out right. There's no reason to regulate individuals."

"What's the difference?" she inquired.

"A hell of a difference. Some day you'll see it. Meanwhile, though, something has to be done about the government of Venus—not only on principle, but because it's going to be a menace to Earth before long. Once Venus is strong, a peaceful, nearly unarmed Earth is going to be just too tempting for your dictators. The World Wars had this much value, they hammered it into our heads and left permanent memorials of destruction to keep reminding us, that the time to cut out a cancer is when it first appears. Wars start for a variety of reasons, but unlimited national sovereignty is always the necessary and sufficient condition. I wish our agents had been on the ball with respect to Venus ten years ago; a lot of good men are going to die because they weren't."

"You might not have come here then," she said shyly.

"Thanks, darling." He kissed her. His mind whirled on, scuttling through a maze that seemed to lead only to his silent, pointless death.

"If I could just get a report back to Earth! That would settle the matter. We'd have spaceships landing UN troops within two years. An expensive operation, of doubtful legality perhaps, a tough campaign so far from home,

especially since we wouldn't want to destroy any cities—but there'd be no doubt of the outcome, and it would surely be carried through; because it would be a matter of survival for us. Of course, the rebellious cities would be helpful, a deal could be made there—and so simple a thing as seizing the food-producing towns would soon force a surrender. You see, it's not only the warning I've got to get home, it's the utterly priceless military intelligence I've got in my head. If I fail, the Guardians will be on the alert, they may very well succeed in spotting and duping every agent sent after me and flanging up something for Earth's consumption. Venus is a long ways off—"

He felt her body tighten in his arms. "So you do want to take over Venus."

"Forget that hogwash, will you? What'd we want with this forsaken desert? Nothing but a trustworthy government for it. Anyway—" His exasperation became a flat hardness: "If you and I are to stay alive much longer, it has to be done."

She said nothing to that.

His mind clicked off astronomical data and the slide rule whizzed through his fingers. "The freighters come regularly on Hohmann 'A' orbits," he said. "That means the next one is due in eight Venus days. They've only got four-man crews, they come loaded with stuff and go back with uranium and thorium ingots which don't take up much room. In short, they could carry quite a few passengers in an emergency, if those had extra food supplies."

"And the ferries land at New America," she pointed out.

"Exactly. My dear, I think our only chance is to take over the whole city!"

It was hot in the barracks room, and rank with sweat. Hollister thought he could almost smell the fear, as if he were a dog. He stood on a table at one end, Barbara next to him, and looked over his assembled crew. Small, thin, swarthy, unarmed and drably clad, eyes wide with frightened waiting, they didn't look like much of an army. But they were all he had.

"*Señores*," he began at last, speaking very quietly, "I have called you all together to warn you of peril to your lives. I think, if you stand with me, we can escape, but it will take courage and energy. You have shown me you possess these qualities, and I hope you will use them now."

He paused, then went on: "I know many of you have been angry with me because I have had my wife here. You thought me another of these bootlickers to a rotten government"—that brought them to full awareness!—"who was being rewarded for some Judas act. It is not true. We all owe our lives to this gallant woman. It was I who was suspected of being hostile to the rulers, and she was sent to spy on me for them. Instead, she told me the truth, and now I am telling it to you."

"You must know that I am an agent from Earth. No, no, I am not an Imperialist. As a matter of fact, the Central American countries were worried about their joint colony, Ciudad Alcazar, your city. It was suspected she had not freely joined this confederation. There are other countries, too, which are worried. I came to investigate for them; what I have seen convinces me they were right."

He went on, quickly, and not very truthfully. He had to deal with their anti-UN conditioning, appeal to the nationalism he despised. (At that, it wouldn't make any practical difference if some countries on Earth retained

nominal ownership of certain tracts on Venus; a democratic confederation would re-absorb those within a generation, quite peacefully.) He had to convince them that the whole gang was scheduled to go to Lucifer; all were suspected, and the death of Valdez confirmed the suspicion, and there was always a labor shortage in the mines. His psych training stood him in good stead, before long he had them rising and shouting. *I shoulda been a politician*, he thought sardonically.

"... And are we going to take this outrage? Are we going to rot alive in that hell, and let our wives and children suffer, forever? Or shall we strike back, to save our own lives and liberate Venus?"

When the uproar had subsided a little, he sketched his plan: a march on Lucifer itself, to seize weapons and gain some recruits, then an attack on New America. If it was timed right, they could grab the city just before the ferries landed, and hold it while all of them were embarked on the freighter—then off to Earth, and in a year or two a triumphant return with the army of liberation!

"If anyone does not wish to come with us, let him stay here. I shall compel no man. I can only use those who will be brave, and will obey orders like soldiers, and will set lives which are already forfeit at hazard for the freedom of their homes. Are you with me? Let those who will follow me stand up and shout 'Yes!'"

Not a man stayed in his seat; the timid ones, if any, dared not do so while their comrades were rising and whooping about the table. The din roared and rolled, bunkframes rattled, eyes gleamed murder from a whirlpool of faces. The first stage of Hollister's gamble had paid off well indeed, he thought; now for the tough part.

He appointed Fernandez his second in command and organized the men into a rough corps; engineering discipline was valuable here. It was late before he and Barbara and Fernandez could get away to discuss concrete plans.

"We will leave two men here," said Hollister. "They will send the usual radio reports, which I shall write in advance for them, so no one will suspect; they will also take care of the rocket when it comes for Barbara, and I *hope* the police will assume it crashed. We will send for them when we hold New America. I think we can take Lucifer by surprise, but we can't count on the second place not being warned by the time we get there."

Fernandez looked steadily at him. "And will all of us leave with the spaceship?" he asked.

"Of course. It would be death to stay. And Earth will need their knowledge of Venus."

"Simón, you know the ship cannot carry fifty men—or a hundred, if we pick up some others at Lucifer."

Hollister's face was wintry. "I do not think fifty will survive," he said.

Fernandez crossed himself, then nodded gravely. "I see. Well, about the supply problem—"

When he had gone, Barbara faced her husband and he saw a vague fright in her eyes. "You weren't very truthful out there, were you?" she asked. "I don't know much Spanish, but I got the drift, and—"

"All right!" he snapped wearily. "There wasn't time to use sweet reasonableness. I had to whip them up fast."

"They aren't scheduled for Lucifer at all. They have no personal reason to fight."

"They're committed now," he said in a harsh tone. "It's fifty or a hundred lives today against maybe a hundred million in the future. That's an attitude which was drilled into me at the Academy, and I'll never get rid of it. If you want to live with me, you'll have to accept that."

"I'll . . . try," she said.

VII.

The towers bulked black through a whirl of dust, under a sky the color of clotted blood. Hollister steered his tank close, speaking into its radio: "Hello, Lucifer. Hello, Lucifer. Come in."

"Lucifer," said a voice in his earphones. "Who are you and what do you want?"

"Emergency. We need help. Get me your captain."

Hollister ground between two high gun towers. They had been built and manned against the remote possibility that a convict outbreak might succeed in grabbing some tanks; he was hoping their personnel had grown lazy with uneventful years. Edging around the main shell of the prison, he lumbered toward the landing field and the nearby radio mast. One by one, the twenty tanks of his command rolled into the compound and scattered themselves about it.

Barbara sat next to him, muffled in airsuit and closed helmet. Her gauntleted hand squeezed his shoulder, he could just barely feel the pressure. Glancing around to her stiffened face, he essayed a smile.

"Hello, there! Captain Thomas speaking. What are you doing?"

"This is Hollister, from the Last Chance air camp. Remember me? We're in trouble and need help. Landslip damn near wiped our place out." The Earthman drove his machine onto the field.

"Well, what are you horsing around like that for? Assemble your tanks in front of the main lock."

"All right, all right, gimme a chance to give some orders. The boys don't seem to know where to roost."

Now! Hollister slapped down the drive switch and his tank surged forward. "Hang on!" he yelled. "Thomas, this thing has gone out of control—Help"

It might have gained him the extra minute he needed. He wasn't sure what was happening behind him. The tank smashed into the radio mast and he was hurled forward against his safety webbing. His hands flew—extend the grapple, snatch that buckling strut, drag it aside, and *push!*

The frame wobbled crazily. The tank stalled. Hollister yanked off his harness, picked up the cutting torch whose fuel containers were already on his back, and went through the air lock without stopping to conserve atmosphere. Blue flame stabbed before him, he slid down the darkened extra faceplate and concentrated on his job. Get this beast down before it sent a call for help!

Barbara got the bull-like machine going again and urged it ahead, straining at the weakened skeleton. The mast had been built for flexibility in the high winds, not for impact strength. Hollister's torch roared, slicing a main support. A piece of steel clanged within a meter of him.

He dropped the torch and dove under the tank, just as the whole structure caved in.

"Barbara!" He picked himself out of the wreckage, looking wildly into the hurricane that blew around him. "Barbara, are you all right?"

She crawled from the battered tank and into his arms. "Our car won't go any more," she said shakily. The engine hood was split open by a falling beam and oil hissed from the cracked block.

"No matter. Let's see how the boys are doing—"

He led a run across the field, staggering in the wind. A chunk of concrete whizzed by his head and he dropped as one of the guard towers went by. Good boys! They'd gone out and dynamited it!

Ignoring the ramp leading down to the garage, Fernandez had brought his tank up to the shell's main air lock for humans. It was sturdily built, but his snorting monster walked through it. Breathable air gasped out. It sleeted a little as formaldehyde took up water vapor and became solid.

No time to check on the rest of the battle outside, you could only hope the men assigned to that task were doing their job properly. Hollister saw one of his tanks go up under a direct hit. All the towers weren't disabled yet. But he had to get into the shell.

"Stay here, Barbara!" he ordered. Men were swarming from their vehicles. He led the way inside. A group of uniformed corpses waited for him, drying and shriveling even as he watched. He snatched the carbines from them and handed them out to the nearest of his followers. The rest would have to make do with their tools till more weapons could be recovered.

Automatic bulkheads had sealed off the rest of the shell. Hollister blasted through the first one. A hail of bullets from the smoking hole told him that the guards within had had time to put on their suits.

He waved an arm. "Bring up Maria Larga!"

It took a while, and he fumed and fretted. Six partisans trundled the weapon forth. It was a standard man-drawn cart for semiportable field equipment, and Long Mary squatted on it: a motor-driven blower connected with six meters of hose, an air blast. This one had had an oxygen bottle and a good-sized fuel tank hastily attached to make a super flame thrower. Fernandez got behind the steel plate which had been welded in front as armor, and guided it into the hole. The man behind whooped savagely and turned a handle. Fire blew forth, and the compartment was flushed out.

There were other quarters around the cell block, which came next, but Hollister ignored them for the time being. The air lock in this bulkhead had to be opened the regular way, only two men could go through at a time, and there might be guards on the other side. He squeezed in with San Rafael and waited while the pump cleaned out the chamber. Then he opened the inner door a crack, tossed a homemade shrapnel grenade, and came through firing.

He stumbled over two dead men beyond. San Rafael choked and fell as a gun spat farther down the corridor. Hollister's .45 bucked in his hand. Picking himself up, he looked warily down the cruelly bright length of the block. No one else. The convicts were yammering like wild animals.

He went back, telling off a few men to cut the prisoners out of their cells, issue airsuits from the lockers, and explain the situation. Then he returned to the job of cleaning out the rest of the place.

It was a dirty and bloody business. He lost ten men in all. There were no wounded: if a missile tore open a suit, that was the end of the one inside. A small hole would have given time to slap on an emergency patch, but the guards were using magnum slugs.

Fernandez sought him out to report that an attempt to get away by rocket had been stopped, but that an indeterminate number of holdouts were in the refinery, which was a separate building. Hollister walked across the field, dust whirling about smashed machines, and stood before the smaller shell.

Thomas' voice crackled in his earphones: "You there! What is the meaning of this?"

That was too much. Hollister began to laugh. He laughed so long he thought perhaps he was going crazy.

Sobering, he replied in a chill tone: "We're taking over. You're trapped in there with nothing but small arms. We can blast you out if we must, but you'd do better to surrender."

Thomas, threateningly: "This place is full of radioactivity, you know. If you break in, you'll smash down the shielding—or we'll do it for you—and scatter the stuff everywhere. You won't live a week."

It might be a bluff, but— "All right," said Hollister with a cheerful note, "you're sealed in without food or water. We can wait. But I thought you'd rather save your own lives."

"You're insane! You'll be wiped out—"

"That's our affair. Any time you want out, pick up the phone and call the office. You'll be locked in the cells with supplies enough for a while when we leave." Hollister turned and walked away.

He spent the next few hours reorganizing; he had to whip the convicts into line, though when their first exuberance had faded they were for the most part ready to join him. Suddenly his army had swelled to more than two hundred. The barracks were patched up and made habitable, munitions were found and passed about, the transport and supply inventoried. Then word came that Thomas' handful were ready to surrender. Hollister marched them into the cell block and assigned some convicts to stand watch.

He had had every intention of abiding by his agreement, but when he was later wakened from sleep with the news that his guards had literally torn the prisoners apart, he didn't have the heart to give them more than a dressing down.

"Now," he said to his council of war, "we'd better get rolling again. Apparently we were lucky enough so that no word of this has leaked out, but it's a long way yet to New America."

"We have not transportation for more than a hundred," said Fernandez.

"I know. We'll take the best of the convicts; the rest will just have to stay behind. They *may* be able to pull the same trick on the next supply train that our boys in Last Chance have ready for the rocket—or they may not. In any event, I don't really hope they can last out, or that we'll be able to take the next objective unawares—but don't tell anyone that."

"I suppose not," said Fernandez somberly, "but it is a dirty business."

"War is always a dirty business," said Hollister.

He lost a whole day organizing his new force. Few if any of the men knew how to shoot, but the guns were mostly recoilless and automatic so he hoped

some damage could be done; doctrine was to revert to construction equipment, which they did know how to use, in any emergency. His forty Latins were a cadre of sorts, distributed among the sixty convicts in a relationship equivalent to that between sergeant and private. The whole unit was enough to make any military man break out in a cold sweat, but it was all he had.

Supply wagons were reloaded and machine guns mounted on a few of the tanks. He had four Venusian days to get to New America and take over—and if the rebels arrived too soon, police reinforcements would pry them out again, and if the radio-control systems were ruined in the fighting, the ferries couldn't land.

It was not exactly a pleasant situation.

The first rocket was sighted on the fifth day of the campaign. It ripped over, crossing from horizon to horizon in a couple of minutes, but there was little doubt that it had spotted them. Hollister led his caravan off the plain, into broken country which offered more cover but would slow them considerably. Well, they'd just have to keep going day and night.

The next day it was an armored, atomic-powered monster which lumbered overhead, supplied with enough energy to go slowly and even to hover for a while. In an atmosphere without oxygen and always riven by storms, the aircraft of Earth weren't possible—no helicopters, no leisurely airboats; but a few things like this one had been built as emergency substitutes. Hollister tuned in his radio, sure it was calling to them.

"Identify yourselves! This is the Guardian Corps."

Hollister adapted his earlier lie, not expecting belief—but every minute he stalled, his tank lurched forward another hundred meters or so.

The voice was sarcastic: "And of course, you had nothing to do with the attack on Lucifer?"

"What attack?"

"That will do! Go out on the plain and set up camp till we can check on you."

"Of course," said Hollister meekly. "Signing off."

From now on, it was strict radio silence in his army. He'd gained a good hour, though, since the watchers wouldn't be sure till then that he was disobeying—and a lovely dust storm was blowing up.

Following plan, the tanks scattered in pairs, each couple for itself till they converged on New America at the agreed time. Some would break down, some would be destroyed en route, some would come late—a few might even arrive disastrously early—but there was no choice. Hollister was reasonably sure none would desert him; they were all committed past that point.

He looked at Barbara. Her face was tired and drawn, the red hair hung lusterless and tangled to her shoulders, dust and sweat streaked her face, but he thought she was very beautiful. "I'm sorry to have dragged you into this," he said.

"It's all right, dear. Of course I'm scared, but I'm still glad."

He kissed her for a long while and then slapped his helmet down with a savage gesture.

The first bombs fell toward sunset. Hollister saw them as flashes through the dust, and felt their concussion rumble in the frame of his tank. He steered into a narrow, overhung gulch, his companion vehicle nosing close behind.

There were two convicts in it—Johnson and Waskowicz—pretty good men, he thought, considering all they had been through.

Dust and sand were his friends, hiding him even from the infrared 'scopes above which made nothing of mere darkness. The rough country would help a lot, too. It was simply a matter of driving day and night, sticking close to bluffs and gullies, hiding under attack and then driving some more. He was going to lose a number of his units, but thought the harassing would remain aerial till they got close to New America. The Guardians wouldn't risk their heavy stuff unnecessarily at any great distance from home.

VIII.

The tank growled around a high pinnacle and faced him without warning. It was a military vehicle, and cannons swiveled to cover his approach.

Hollister gunned his machine and drove directly up the pitted road at the enemy. A shell burst alongside him, steel splinters rang on armor. Coldly, he noted for possible future reference the relatively primitive type of Venusian war equipment: no tracker shells, no Rovers. He had already planned out what to do in an encounter like this, and told his men the idea—now it had happened to him.

The Guardian tank backed, snarling. It was not as fast or as maneuverable as his, it was meant for work close to cities where ground had been cleared. A blast of high-caliber machine-gun bullets ripped through the cab, just over his head. Then he struck. The shock jammed him forward even as his grapple closed jaws on the enemy's nearest tread.

"Out!" he yelled. Barbara snatched open the air lock and fell to the stones below. Hollister was after her. He flung a glance behind. His other tank was an exploded ruin, canted to one side, but a single figure was crawling from it, rising, zigzagging toward him. There was a sheaf of dynamite sticks in one hand. The man flopped as the machine gun sought him and wormed the last few meters. Waskowicz. "They got Sam," he reported, huddling against the steel giant with his companions. "Shall we blast her?"

Hollister reflected briefly. The adversary was immobilized by the transport vehicle that clutched it bulldog fashion. He himself was perfectly safe this instant, just beneath the guns. "I've got a better notion. Gimme a boost."

He crawled up on top, to the turret lock. "O.K., hand me that torch. I'm going to cut my way in!"

The flame roared, biting into metal. Hollister saw the lock's outer door move. So—just as he had expected—the lads inside wanted out! He paused. A suited arm emerged with a grenade. Hollister's torch slashed down. Barbara made a grab for the tumbling missile and failed. Waskowicz tackled her, landing on top. The thing went off.

Was she still alive—? Hollister crouched so that the antenna of his suit radio poked into the lock. "Come out if you want to live. Otherwise I'll burn you out."

Sullenly, the remaining three men appeared, hands in the air. Hollister watched them slide to the ground, covering them with his pistol. His heart

leaped within him when he saw Barbara standing erect. Waskowicz was putting an adhesive patch on his suit where a splinter had ripped it.

"You O.K.?" asked Hollister.

"Yeah," grunted the convict. "Pure dumb luck. Now what?"

"Now we got us one of their own tanks. Somebody get inside and find some wire or something to tie up the Terrible Three here. And toss out the fourth."

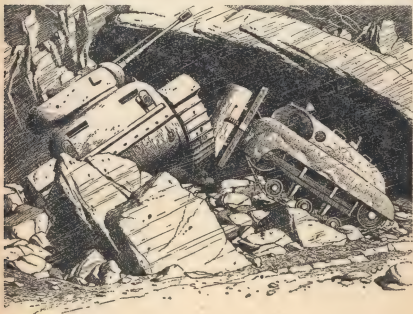
"That's murder!" cried one of the police. "We've only got enough oxy for four hours in these suits—"

"Then you'll just have to hope the battle is over by then," said Hollister unsympathetically. He went over and disentangled the two machines.

The controls of the captured tank were enough like those of the ordinary sort for Barbara to handle. Hollister gave Waskowicz a short lecture on the care and feeding of machine guns, and sat up by the 40 mm. cannon himself; perforce, they ignored the 20. They closed the lock but didn't bother to replenish the air inside; however, as Hollister drove up the mountainside, Waskowicz recharged their oxygen bottles from the stores inside the vehicle.

The battle was already popping when they nosed up onto the ledge and saw the great sweep of the city. Drifting dust limited his vision, but Hollister saw his own machines and the enemy's. Doctrine was to ram and grapple the military tank, get out and use dynamite or torches, and then worm toward the colony's main air lock. It might have to be blown open, but bulkheads should protect the civilians within.

An engineer tank made a pass at Hollister's. He turned aside, realizing



that his new scheme had its own drawbacks. Another police machine came out of the dust; its guns spoke, the engineers went up in a flash and a bang, and then it had been hit from behind. Hollister set his teeth and went on. It was the first time he had seen anything like war; he had an almost holy sense of his mission to prevent this from striking Earth again.

The whole operation depended on his guess that there wouldn't be many of the enemy. There were only a few Guardians in each town, who wouldn't have had time or reserves enough to bring in a lot of reinforcements; and tanks couldn't be flown in. But against their perhaps lesser number was the fact that they would fight with tenacity and skill. Disciplined as engineer and convicts were, they simply did not have the training—even the psychological part of it which turns frightened individuals into a single selfless unit. They would tend to make wild attacks and to panic when the going got rough—which it was already.

He went on past the combat, toward the main air lock. Dim shapes began to appear through scudding dust. Half a dozen mobile cannon were drawn up in a semicircle to defend the gate. That meant—all the enemy tanks, not more than another six or seven, out on the ledge fighting the attackers.

"All right," Hollister's voice vibrated in their earphones. "We'll shoot from here. Barbara, move her in a zigzag at 10 KPH, keeping about this distance; let out a yell if you think you have to take other evasive action. Otherwise I might hit the city."

He jammed his faceplate into the rubberite viewscope and his hands and feet sought the gun controls. Crosshairs—range—*fire one!* The nearest cannon blew up.

Fire two! Fire three! His 40 reloaded itself. Second gun broken, third a clean miss—*Fire four! Gotcha!*

A rank of infantry appeared, their suits marked with the Guardian symbol. They must have been flown here. Waskowicz blazed at them and they broke, falling like rag dolls, reforming to crawl in. They were good soldiers. Now the other three enemy mobiles were swiveling about, shooting through the dust. "Get us out of here, Barbara!"

The racket became deafening as they backed into the concealing murk. Another enemy tank loomed before them. Hollister fed it two shells almost point blank.

If he could divert the enemy artillery long enough for his men to storm the gate—

He saw a police tank locked with an attacker, broken and dead. Hollister doubted if there were any left in action now. He saw none of his own vehicles moving, though he passed by the remnants of several. And where were his men?

Shock threw him against his webbing. The echoes rolled and banged and shivered for a long time. His head swam. The motors still turned, but—

"I think they crippled us," said Barbara in a small voice.

"O.K. Let's get out of here." Hollister sighed; it had been a nice try, and had really paid off better than he'd had a right to expect. He scrambled to the lock, gave Barbara a hand, and they slid to the ground as the three fieldpieces rolled into view on their self-powered carts.

The stalled tank's cannon spoke, and one of the police guns suddenly

slumped. "Waskowicz!" Barbara's voice was shrill in the earphones. "He stayed in there—"

"We can't save him. And if he can fight our tank long enough—Build a monument to him some day. Now come on!" Hollister led the way into curtain-ing gloom. The wind hooted and clawed at him.

As he neared the main lock, a spatter of rifle fire sent him to his belly. He couldn't make out who was there, but it had been a ragged volley—take a chance on their being police and nailing him—"Just us chickens, boss!" he shouted. Somewhere in a corner of his mind he realized that there was no reason for shouting over a radio system. His schooled selfcontrol must be slipping a bit.

"Is that you, Simón?" Fernandez's voice chattered in his ears. "Come quickly, now, we're at the lock but I think they will attack soon."

Hollister wiped the dust from his faceplate and tried to count how many there were. Latins and convicts, perhaps twenty—"Are there more?" he inquired. "Are you the last?"

"I do not know, Simón," said Fernandez. "I had gathered this many, we were barricaded behind two smashed cars, and when I saw their artillery pull away I led a rush here. Maybe there are some partisans left besides us, but I doubt it."

Hollister tackled the emergency control box which opened the gate from outside. It would be nice if he didn't have to blast—Yes, by Heaven! It hadn't been locked! He jammed the whole score into the chamber, closed the outer door and started the pumps.

"They can get in, too," said Fernandez dubiously.

"I know. Either here or by ten other entrances. But I have an idea. All of you stick by me."

The anteroom was empty. The town's civilians must be huddled in the inner compartments, and all the cops must be outside fighting. Hollister threw back his helmet, filling his lungs with air that seemed marvelously sweet, and led a quick but cautious trot down the long halls.

"The spaceship is supposed to have arrived by now," he said. "What we must do is take and hold the radio shack. Since the police don't know exactly what our plans are, they will hesitate to destroy it just to get at us. It will seem easier merely to starve us out."

"Or use sleepy gas," said Fernandez. "Our suits' oxygen supply isn't good for more than another couple of hours."

"Yes . . . I suppose that is what they'll do. That ship had better be up there!"

The chances were that she was. Hollister knew that several days of ferrying were involved, and had timed his attack for hours after she was scheduled to arrive. For all he knew, the ferries had already come down once or twice.

He didn't know if he or anyone in his band would live to be taken out. He rather doubted it; the battle had gone worse than expected, he had not captured the city as he hoped—but the main thing was to get some kind of report back to Earth.

A startled pair of technics met the invaders as they entered. One of them began an indignant protest, but Fernandez waved a rifle to shut him up. Hollister glanced about the gleaming controls and meters. He could call the ship himself, but he didn't have the training to guide a boat down. Well—

He pulled off his gloves and sat himself at the panel. Keys clattered beneath his fingers. When were the cops coming? Any minute.

"Hello, freighter. Hello, up there. Spaceship, this New America calling. Come in."

Static buzzed and crackled in his earphones.

"Come in, spaceship. This is New America. Come in, damn it!"

Lights flashed on the board, the computer clicked, guiding the beam upward. It tore past the ionosphere and straggled weakly into the nearest of the tiny, equally spaced robot relay stations which circled the planet. Obedient to the keying signal, the robot amplified the beam and shot it to the next station, which kicked it farther along. The relay closest to the spaceship's present position in her orbit focused the beam on her.

Or was the orbit empty?

". . . Hello, New America." The voice wavered, faint and distorted. "*Evening Star* calling New America. What's going on down there? We asked for a ferry signal three hours ago."

"Emergency," snapped Hollister. "Get me the captain—fast! Meanwhile, record this."

"But—"

"Fast, I said! And record. This is crash priority, condition red." Hollister felt sweat trickling inside his suit.

"Recording. Sending for the captain now."

"Good!" Hollister leaned over the mike. "For Main Office, Earth, United Nations Inspectorate. Repeat: Main Office, UN Inspectorate. Urgent, confidential. This is Agent A-431-240. Repeat, Agent A-431-240. Code Watchbird. Code Watchbird. Reporting on Venusian situation as follows—" He began a swift sketch of conditions.

"I think I hear voices down the hall," whispered Barbara to Fernandez.

The Latin nodded. He had already dragged a couple of desks into the corridor to make a sort of barricade; now he motioned his men to take positions: a few outside, the rest standing by, crowded together in the room. Hollister saw what was going on and swung his gun to cover the two technicians. They were scared, and looked pathetically young, but he had no time for mercy.

A voice in his earphones, bursting through static: "This is Captain Brackney. What d'you want?"

"UNI business, captain. I'm besieged in the GCA shack here with a few men. We're to be gotten out at all costs if it's humanly possible."

He could almost hear the man's mouth fall open. "God in space—is that the truth?"

Hollister praised the foresight of his office. "You have a sealed tape aboard among your official records. All spaceships, all first-class public conveyances, do. It's changed by an Un-man every year or so. O.K., that's an ID code, secret recognition signal. It proves my right to commandeer everything you've got."

"I know that much. What's on the tape?"

"This year it will be, 'Twas brillig and the slithy toves give me liberty or give me pigeons on the grass alas.' Have your radioman check that at once."

Pause. Then: "O.K., I'll take your word for it till he does. What do you want?"

"Bring two ferries down, one about fifty kilometers behind the other. No arms on board, I suppose? . . . No. Well, have just the pilots aboard, because you may have to take twenty or so back. How long will this take you? . . . Two hours? That long? . . . Yes, I realize you have to let your ship get into the right orbital position and— All right, if you can't do it in less time. Be prepared to embark anyone waiting out there and lift immediately. Meanwhile stand by for further instructions . . . Hell, yes, you can do it!"

Guns cracked outside.

"O.K. I'll start recording again in a minute. Get moving, captain!" Hollister turned back to the others.

"I have to tell Earth what I know, in case I don't make it," he said. "Also, somebody has to see that these technies get the boats down right. Diego, I'll want a few men to defend this place. The rest of you retreat down the hall and pick up some extra oxy bottles for yourselves and all the concentrated food you can carry; because that ship won't have rations enough for all of us. Barbara will show you where it is."

"And how will you get out?" she cried when he had put it into English.

"I'll come to that. You've got to go with them, dear, because you live here and know where they can get the supplies. Leave a couple of suits here for the technies, pick up others somewhere along the way. When you get outside, hide close to the dome. When the ferry lands, some of you make a rush to the shack here. It's right against the outer wall. I see you're still carrying some dynamite, Garcia. Blow a hole to let us through . . . Yes, it's risky, but what have we got to lose?"

She bent to kiss him. There wasn't time to do it properly. A tommy-gun was chattering in the corridor.

Hollister stood up and directed his two prisoners to don the extra suits. "I've no grudge against you boys," he said, "and in fact, if you're scared of what the cops might do to you, you can come along to Earth—but if those boats don't land safely, I'll shoot you both down."

Fernandez, Barbara, and a dozen others slipped out past the covering fire at the barricade and disappeared. Hollister hoped they'd make it. They'd better! Otherwise, even if a few escaped, they might well starve to death on the trip home.

The food concentrate would be enough. It was manufactured by the ton at Little Moscow—tasteless, but pure nourishment and bulk, normally added to the rest of the diet on Venus. It wouldn't be very palatable, but it would keep men alive for a long time.

The technies were at the board, working hard. The six remaining rebels slipped back into the room; two others lay dead behind the chewed-up barricade. Hollister picked up an auxiliary communication mike and started rattling off everything about Venus he could think of.

A Guardian stuck his head around the door. Three guns barked, and the head was withdrawn. A little later, a white cloth on a rifle barrel was waved past the edge.

Hollister laid down his mike. "I'll talk," he said. "I'll come out, with my arms. You'll have just one man in sight, unarmed." To his men he gave an order to drag the dead into the shack while the truce lasted.

Karsov met him in the hall. He stood warily, but there was no fear on the smooth face. "What are you trying to do?" he asked in a calm voice.

"To stay out of your mines," said Hollister. It would help if he could keep up the impression this was an ordinary revolt.

"You have called that ship up there, I suppose?"

"Yes. They're sending down a ferry."

"The ferry could have an accident. We would apologize profusely, explain that a shell went wild while we were fighting you gangsters, and even pay for the boat. I tell you this so that you can see there is no hope. You had better give up."

"No hope if we do that either," said Hollister. "I'd rather take my chances back on Earth; they can't do worse there than treat my mind."

"Are you still keeping up that farce?" inquired Karsov. But he wasn't sure of himself, that was plain. He couldn't understand how an Un-man could have gotten past his quiz. Hollister had no intention of enlightening him.

"What have you got to lose by letting us go?" asked the Earthman. "So we tell a horror story back home. People there already know you rule with a rough hand."

"I am not going to release you," said Karsov. "You are finished. That second party of yours will not last long, even if they make it outside as I suppose they intend—they will suffocate. I am going to call the spaceship captain on the emergency circuit and explain there is a fight going on and he had better recall his boat. That should settle the matter; if not, the boat will be shot down. As for your group, there will be sleep gas before long."

"I'll blow my brains out before I let you take me," said Hollister sullenly.

"That might save a lot of trouble," said Karsov. He turned and walked away. Hollister was tempted to kill him, but decided to save that pleasure for a while. No use goading the police into a possible use of high explosives.

He went back to the shack and called the *Evening Star* again. "Hello, Captain Brackney? UNI speaking. The bosses down here are going to radio you with a pack of lies. Pretend to believe them and say you'll recall your ferry. Remember, they think just one is coming down. Then—" He continued his orders.

"That's murder!" said the captain. "Pilot One won't have a chance—"

"Yes, he will. Call him now, use spacer code; I don't think any of these birds know it, if they should overhear you. Tell him to have his spacesuit on and be ready for a crash landing, followed by a dash to the second boat."

"It's still a long chance."

"What do you think I'm taking? These are UNI orders, captain. I'm boss till we get back to earth, if I live so long. All right, got everything? Then I'll continue recording."

After a while he caught the first whiff and said into the mike: "The gas is coming now. I'll have to close my helmet. Hollister signing off."

His men and the technicians slapped down their cover. It would be peaceful here for a little time, with this sector sealed off while gas poured through its ventilators. Hollister tried to grin reassuringly, but it didn't come off.

"Last round," he said. "Half of us, the smallest ones, are going to go to sleep now. The rest will use their oxygen, and carry them outside when we go."

Someone protested. Hollister roared him down. "Not another word! This

is the only chance for all of us. No man has oxygen for much more than an hour; we have at least an hour and a half to wait. How else can we do it?"

They submitted unwillingly, and struggled against the anaesthetic as long as they could. Hollister took one of the dead men's bottles to replace the first of his that gave out. His band was now composed of three sleeping men and three conscious but exhausted.

He was hoping the cops wouldn't assault them quickly. Probably not; they would be rallying outside, preparing to meet the ferry with a mobile cannon if it should decide to land after all. The rebels trapped in here would keep.

The minutes dragged by. A man at the point of death was supposed to review his whole life, but Hollister didn't feel up to it. He was too tired. He sat watching the telescreen which showed the space field. Dust and wind and the skeleton cradles, emptiness, and a roiling gloom beyond.

One of the wakeful men, a convict, spoke into the helmet circuit: "So you are UNI. Has all this been just to get you back to Earth?"

"To get my report back," said Hollister.

"There are many dead," said one of the Latins, in English. "You have sacrificed us, played us like pawns, no? What of those two we left back at Last Chance?"

"I'm afraid they're doomed," said Hollister tonelessly, and the guilt which is always inherent in leadership was heavy on him.

"It was worth it," said the convict. "If you can smash this rotten system, it was well worth it." His eyes were haunted. They would always be haunted.

"Better not talk," said Hollister. "Save your oxygen."

One hour. The pips on the radarscopes were high and strong now. The spaceboats weren't bothering with atmospheric braking, they were spending fuel to come almost straight down.

One hour and ten minutes. Was Barbara still alive?

One hour and twenty minutes.

One hour and thirty minutes. Any instant—

"There, señor! There!"

Hollister jumped to his feet. Up in a corner of the screen, a white wash of fire—here she came!

The ferry jettied slowly groundward, throwing up a blast of dust as her fierce blasts tore at the field. Now and then she wobbled, caught by the high wind, but she had been built for just these conditions. Close, close—were they going to let her land after all? Yes, now she was entering the cradle, now the rockets were still.

A shellburst struck her hull amidships and burst it open. The police were cautious, they hadn't risked spilling her nuclear engine and its radioactivity on the field. She rocked in the cradle. Hollister hoped the crash-braced pilot had survived. And he hoped the second man was skillful and had been told exactly what to do.

That ferry lanced out of the clouds, descending fast. She wasn't very maneuverable, but the pilot rode her like a horseman, urging, pleading, whipping and spurring when he had to. She slewed around and fell into a shaky curve out of screen range.

If the gods were good, her blast had incinerated the murderers of the first boat.

She came back into sight, fighting for control. Hollister howled. "Guide her into a cradle!" He waved his gun at the seated technicians. "Guide her safely in if you want to live!"

She was down.

Tiny figures were running toward her heedless of earth still smoking underfoot. Three of them veered and approached the radio shack. "O.K.!" rapped Hollister. "Back into the corridor!" He dragged one of the unconscious men himself; stooping, he sealed the fellow's suit against the poison gases outside. There would be enough air within it to last a sleeper a few minutes.

Concussion smashed at him. He saw shards of glass and wire flying out the door and ricocheting nastily about his head. Then the yell of Venus' wind came to him. He bent and picked up his man. "Let's go!"

They scrambled through the broken wall and out onto the field. The wind was at their backs, helping them for once. One of the dynamiters moved up alongside Hollister. He saw Barbara's face, dim behind the helmet.

When he reached the ferry, the others were loading the last boxes of food. A figure in space armor was clumping unsteadily toward them from the wrecked boat. Maybe their luck had turned. Sweeping the field with his eyes, Hollister saw only ruin. There were still surviving police, but they were inside the city and it would take minutes for them to get out again.

He counted the men with him and estimated the number of food boxes. Fifteen all told, including his two erstwhile captives—Barbara's party must have met opposition—but *she* still lived, God be praised! There were supplies enough, it would be a hungry trip home but they'd make it.

Fernandez peered out of the air lock. "Ready," he announced. "Come aboard. We have no seats, so we must rise at low acceleration, but the pilot says there is fuel to spare."

Hollister helped Barbara up the ladder and into the boat. "I hope you'll like Earth," he said awkwardly.

"I know I will—with you there," she told him.

Hollister looked through the closing air lock at the desolation which was Venus. Some day it would bloom, but—

"We'll come back," he said.

THE END

IN TIMES TO COME

Next issue features A. J. Budrys' story "The End Of Summer," a yarn about immortality. It's an old theme in science fiction, of course . . . but have you ever tried defining just exactly what immortality means? Try it—and you'll find, as Budrys does in "The End Of Summer," that it's not what it's cracked up to be! My friend . . . you don't want it!

THE EDITOR.



THE DEVIANT

By EVERETT B. COLE

There are some types of individuals who are misfits in any culture, anywhere, at any level of development. The one who won't see a job through, who won't take the effort to earn what he desires . . .

Illustrated by von Dongen

CONSCIOUSNESS came slowly. For a time he lay, eyes closed, merely enjoying the sense of being.

"Who?" "What?" "Where?" These were irrelevant questions which did not intrude themselves into his level of thought. He had no care as to when or why. He merely was, and it was pleasant.

This carefree suspension of being lasted for a time, then acceptance of the physical world was forced upon him. He felt the weight of blankets. Street sounds penetrated the room, struck his ears, and forced his analytical powers into action.

He opened his eyes, idly gazed at the ceiling, to study the interplay of light and shadow on the pale, brown surface. There was a faint, expectant impression. Somehow, he felt there was something in the background, which was of breath-

less interest, but as he was reaching to seize and define the thought, his mind came into normality like a machine suddenly thrust into gear.

The sense of expectancy gave way to drab reality. Crei Deloran realized that he was just an ordinary individual, living in an ordinary apartment. There was nothing enthralling about the city, his job, or his future. There couldn't be, or he would attract unwanted notice. And then? He shook his head.

He kicked the covers away, got out of bed, and went around into the dressing room. Nothing unusual here. He'd done this for many mornings.

There was no problem involved in picking out something to wear. One suit was at the cleaner's. He could choose the other, which hung in its usual place. Of course, there were the casual garments, which he preferred, but Mr. Diore insisted—Crei brushed the thought of Mr. Diore from his mind.

He took the suit from its hanger, held the garments up to the window, and examined them critically. The coat wasn't bad, but the trousers weren't so good. They hadn't become quite transparent but it wouldn't be too long. He shrugged. Have to get another suit, but it would have to be much like this. One had to conform to custom.

He selected the rest of his clothing, slipped on his shoes, and wandered into the kitchenette to plug in the heater. For an instant, he glanced about the room, then he crossed into the bathroom.

A face looked out from the mirror, and he examined it, but found nothing of great interest. It was his own face, of course, and it had the normal allotment of features, distributed in the usual way. It certainly hadn't changed in any manner during the night, if he ignored the slight puffiness from sleep.

It wasn't a repulsive face. Nor was it particularly handsome or intriguing, either to himself or to anyone else. There was simply nothing exceptional about it. It was an average collection of average features.

Idly, he started reviewing his memory, casting back to the days when he had come here. He had been in search of two things. He had needed refuge, and he had wanted entertainment. He had found the necessity of gaining subsistence. He had discovered the techniques of concealment. But these were not entertaining.

Too, he had found refuge. There had been that one time when he had been detected and nearly caught, but he had mingled with the crowd in time. He had become unrecognizable as an individual, and they had completely lost him. For a while, there had been a certain exhilaration in that, but it had worn off.

He shook his head. "Better quit feeling sorry for myself," he said aloud, "or I'll start radiating."

He finished shaving, dressed, then went back to the kitchenette. The water was hot, and he made a cup of tea. He reached toward the refrigerator, then looked at it distastefully.

"Aw, to heck with it," he told himself. "I'll grab something at Jano's."

He sipped the hot drink, gazing moodily about the apartment. There was the small kitchenette, the tiny bathroom, and there was the miniature enclosure which was in turn living room, study, and bedroom. At the moment, with the wall bed down, and with very little extra space to move about in, it was a bedroom.

He set the cup on a table and straightened the sheets and blankets. A quick heave sent the bed upward on its brackets, and he spun the panel, swinging the

bed into what had been the dressing room, and converting the rest of the space into a living room. He rearranged the furniture, then finished his tea, kicked out a wrinkle in the rug, and took his cup back to the kitchenette. After a glance at his watch, he went out, leaving the door slightly ajar. It was Mrs. Malei's day for cleaning.

He walked up to Dwan Street, bought a newspaper, and shook it out as he waited for the bus.

There had been another serious vehicular accident just outside of the city. Two cars, racing on the highway, had struck a third. There had been no survivors.

Crei grunted and looked at another story. An important smuggling case had been referred to the courts. Authorities said that investigators had— He turned the page.

Tires hummed on the pavement. There was a faint squeal of brakes. Crei folded the paper, and jumped aboard the bus as it slackened speed for the turn.

In half an hour or so, buses would come by with people hanging from every possible handhold, but Deloran noted with satisfaction that this one wasn't particularly crowded. Crowds were something he still couldn't stand, and he often went to considerable trouble to avoid them.

He chose a seat in the front open section, and watched the city creep past as the bus crawled down the hill.

It was all wrong, he told himself. The city hadn't changed, of course, for it had changed but slightly in many years, and probably would undergo little change in many more. But he, Crei Deloran, was completely out of tune.

He looked down a cross street, comparing it with the broad, smooth avenues of his own faraway home. This place was confining—almost a prison. Maybe it would be better to simply call in the searchers and surrender.

Then, he dismissed the notion as absurdly impossible. At least, here, he could do as he pleased during his leisure time. There, no leisure would be allowed. He had heard tales of the Rehabilitation Center, and they weren't good. Trainees, he had been told, spent all their waking time in directed activity. Freedom of choice was limited to actions in response to prescribed situations. And there was no let-up until they decided that rehabilitation was complete.

After that, there were the long cycles, of compensatory service, and again there'd be little or no leisure. Deloran shook his head. That was not for him. Here, he could at least choose some of his own actions.

He studied the other passengers. A young woman sat near him, looking out at the store fronts as they passed. Next to her was an elderly man, engrossed in his newspaper. Crei looked at him, casually wondering who he was, and what his place in society might be.

The old gentleman paused in his reading, looked up, glanced from side to side, and noticed Deloran. He shook his head as though dislodging an annoying insect, then returned to his paper. Crei could catch no definite thought in the confused shimmer, but an inarticulate annoyance was obvious.

On his other side sat a soldier, who stared incuriously at the cars parked along the street. Deloran looked carefully at the man, noting the multiple rows of ribbons, the pattern of stripes on his sleeve.

Whoever he was, Crei thought, this character was quite at ease. Somehow, the man gave the impression that he would be at ease in any city or place in the world, and he had apparently been in several of them.

Deloran grinned wryly as he thought of his own prosaic job, to which he seemed to be confined. He thought of his definite longing for adventure, which had originally driven him from his own culture, led him to this place, and then caused him to be planet-bound. The feeling of confinement intensified.

I wonder, he thought, whether rehabilitation's so bad, after all. Maybe— Then he smiled. *No, I guess I like my freedom too much.*

The soldier glanced around, looked Crei over for a moment, then returned to his regard of Orona Street. Deloran looked away, feeling that wordless animosity again. It puzzled him.

They couldn't actually receive, he knew. Even if they could, they would get nothing, so long as his shield was up. And he was sure it was. It was impossible that there was any leakage, or he would have been detected long ago.

He looked at the store fronts, worrying at the problem. They radiated strongly, but their thought patterns, if they could be called such, were confused, varying amorphous. They were incapable of receiving and interpreting any radiation. But somehow, they seemed to be capable of some mental reaction when he was near them. What was it? He shrugged uneasily.

The bus squealed to a stop at the end of the line, and Deloran slid off to walk rather tensely down Mira Street. He glanced into shop windows as he passed them, then looked away again. There was nothing of interest. He had seen these, and more, many times. At last, he entered a small restaurant.

The counterman looked around as he came in.

"Oh, hello," he greeted. "Didn't feel like rolling your own this morning, huh?"

Crei selected a stool and flopped his paper on the counter. "No," he admitted. "Feel out of tune with the world."

"They run wrong yesterday?"

"Uh uh." Crei looked at him thoughtfully. "Never play 'em, Jano. Thought you knew that." He hesitated.

"Look," he finally added, "I've been coming in here for a long time now, and you ought to know me fairly well by this time. Do I ever get on your nerves?"

"Huh?" Jano had started to make a cup of tea. Now, he faced half way around, staring curiously at his customer. He stood for a moment, both hands full, then finished pouring water.

Deliberately, he put the pan back on the heater, then he came to the counter, placing the full cup before Crei. He put his elbows on the counter.

"You serious?" he demanded. "Or just making conversation?"

"Serious," Crei told him. "Seems to me that people resent it whenever I look at 'em."

Jano nodded. "Yeah," he said, "yeah, I know what you mean. It really isn't that bad, though. It's just once in a while." He paused, looking out at the street.

"Tell you, Deloran, you've been a customer of mine for a long time. I've got used to you, and I like you—now. Even at that, once in a while, I get a funny feeling. Then, I get a little mad. Feels like there oughta be someone there, but I'm sure there's nobody. Then, I turn around, and you're watching me.

"I don't know. Like I said, you're an old customer, and I think you're a pretty decent guy. But I get uneasy once in a while. And then—" Jano waved a hand. "Oh, well," he finished, "sausages?"

"Sure," Crei nodded. "Sure, sausages'll do." He picked up his newspaper.

As he ate, he reviewed the conversation. Jano hadn't really said much that

made sense. But for a few isolated seconds, his thoughts had focused. There was a little nervousness, a little resentment. Somehow, there was a faint hint of fear, a suggestion of probing against the impenetrable shield Deloran held to protect his mind. Crei shook his head. But they couldn't probe—could they?

He looked up. Jano was cleaning the grill. Somewhere in that shimmer of unfocused thought, there was a small part of the answer. A phrase appeared.

"Cold . . . no life."

Deloran blinked. They could receive to a limited extent, then. They couldn't pick up articulate thoughts, but they could detect the presence of thought. And he— But it was impossible.

If he relaxed his shield, his radiation would be too steady, too well defined. He couldn't diffuse and vary his thought patterns to simulate theirs without constant effort. And even then, it would be patently false.

"No," he told himself, "I've got to remain silent. If I should relax, the detectors would be on me in minutes."

He finished his meal and walked slowly out of the restaurant.

Here was something new to add to an already complex problem. His situation had certainly changed—was still changing. He could remember clearly back to the day when he had abandoned his ship. Then, he had thought he could evade the Stellar Guard completely.

He had been so careful about setting a new course, which would jump the ship to a new position, hundreds of light-years away. And if all had been right, they should have assumed that he had been destroyed with the burned-out control room.

He had been so certain of his success, and he had acted with such assurance. And he *had* been successful—for a while.

But they hadn't been fooled. He had thought he was doing well until they had betrayed their presence on the planet by an unguarded communication. That had been their one mistake.

He had gotten away, and they'd lost him. He had sensed no further traces of them on his trail, though he knew they were still here.

Of course, he had been forced to abandon his equipment. His computer had remained in the luxurious mountain cabin, as had his weapon and his force shield. To be sure, they were small loss. He couldn't have used any of them without being detected. And, if he still had them, they would be more tantalizing than the thought of their loss.

By now, he had gotten so used to holding a mental shield that it was almost involuntary. At first, he had been afraid that he would relax and radiate while he was sleeping, but he'd lost that fear now. Of course, the inability to radiate, even for a probe, meant that he had to rely on indistinct, wavering thoughts from the natives to guess at their reactions. He actually had no more than a clue to their emotions, and could use only vocalized words to influence them.

But even that little was an advantage. He had been able to work up from woodcarver to department head. And, he'd continue. One day, he'd move up another step on the ladder, and he would eventually be in a satisfactory position despite the restrictions placed on him by the presence of the searchers and observers.

He looked at the other pedestrians. It was a shame, of course, that he couldn't make an adequate living as a woodcarver. He had always enjoyed working with hand tools, and he'd been a superlatively good stocker.

But there was no money in it.

It had been that way before, in the Galactic Civilization. He had tried handicrafts from time to time, and had been good at them, but he'd been unable to achieve the position of luxury he desired by that means. More was required than simple manual skill. One had to be an artist, or an executive.

Well, he had developed a certain amount of executive ability. He could manage his department, but he'd much rather be showing some one of the younger stockers the intricate tricks of the trade.

Again, he glanced about the street, noting a pedestrian ahead of him. There was a vague suggestion of resentment, nondirectional, but apparent. Behind it was the usual shimmer of unresolved thought, which weaved from band to band. Deloran shook his head. He should be used to it by now.

Of course, if he could only drop his shield, it would be easy to force the man's mind into a channel. Then, it would be quite readable. But that was what he couldn't do, even if it were worth the trouble. Any extended mental radiation would—

He thought of the rehabilitation center again.

Deloran went around the corner and down the short street to the stone gate with the bas-relief hunting scenes on either side of it. He nodded to the gatekeeper, made his way to the main building, and walked upstairs.

He refrained from looking too closely at the clerks as he threaded his way through the production department to his desk.

There were a few delivery reports and some invoices in his basket. He drew them to him, checking them rapidly, then turned to the production figures for his section.

The custom shop, he noticed, was having a little more than its usual difficulty in getting suitable wood. He went back to the delivery reports, rechecking the shipments. There had been adequate receipts, and the normal percentage of first-grade blocks had been cut. He looked at the production report again.

The backlog was abnormal, and the stock of custom-grade rifles was exhausted. He turned to the stack of invoices, checking through them.

Clipped to one invoice was a memo which simply said, "See me," and bore the initials, JLD. Crei looked at it, then stopped, examining the document carefully. It was a large shipment—too large, even if it hadn't been to Varo Export.

He picked up the phone and called Shipping.

"Say, Morei, did you ship on invoice seventeen thirty-two?"

"Minute." There was a slight clank as the phone was set down.

"Oh, that one. No, I kicked it back. The guns're still in stock. Thought I'd heard something about that outfit. Why?"

"Good. Cancel shipment. They're under investigation, and there's going to be trouble pretty soon. I'll get the thing straightened out from this end. Thanks for catching it."

"Think nothing of it."

Deloran replaced his phone. It was funny, he thought. He distinctly remembered giving definite instructions against soliciting Varo Export, but Caron had gone ahead and picked up a large order for custom-grade rifles. He looked at the invoice again.

Seemed funny, too, that it had gotten into the manager's office before it came to his desk. He sighed and got out of his chair.

"Better find out about this one," he told himself, "now."

There were two other department heads in the office. They started to go when Deloran came in, but Mr. Diore waved them back.

"Yes, Deloran," he said, "what is it?"

Crei held out the invoice. "I believe you wanted to see me on this one?"

Diore took the paper, glanced at it, then looked up again.

"Yes. I did. Why didn't you explain to Caron that he wasn't to contact Varo Export for further orders?"

"I told Caron to stay away from Varo, Mr. Diore. And I told him why."

"Did you put it in writing?"

"No." Crei shook his head. "I didn't think it would be either necessary or advisable. Caron's smart enough to take instructions, I believe . . . or, I—"

"You didn't think! You believe! Frankly, Deloran, I'm getting tired of your thinking. Caron did go to Varo. He did pick up an order, and he doesn't remember any instructions from you." Diore paused.

"Fortunately," he added bitterly, "one of the people down in Shipping caught the invoice and sent it back for double check, so we're just embarrassed." He thrust the paper at Crei, violently.

"Now, get on this. Make it clear to Caron that he's not to contact Varo again, and get this order canceled. Is that clear?"

"Of course, I'll get on it right away." Crei started to leave.

"Just a minute, *Mister Deloran*."

Crei turned back. Diore was glaring at him.

"I want you to understand this. You'll have to give the people out in the field some attention. I don't know why your Custom Department has its own sales force, but it has, and it's your responsibility. But you're ignoring it.

"Every morning, you come in and simply park behind your desk. Then you drift down to that Custom shop and waste time fooling around with some carving job that a stocker should be doing. You're not getting things done as they should be, and you're acting like some mill hand. You have a job to do, and I want to see you do it."

"But you criticized me only a short time ago for—"

"I'm not going to tell you every detail on how to run your job," snapped Diore. "But I want you to see to it that it runs smoothly. I'm getting tired of having to check up on you constantly."

The two department heads looked uncomfortable, but Crei could detect a trace of malicious enjoyment in their minds. For a few heartbeats, he stood, looking at them, then he looked back at his superior.

There was no question about it, Diore had been constantly checking—even interfering. He had been issuing vague, contradictory orders for several months. He had given instructions which were difficult to pin down and define, and yet which were somehow mutually exclusive—verbal instructions always, delivered in an emphatic manner. And, he'd been actually dealing with the men in sales, by-passing Crei entirely at times.

Deloran opened his mind, chancing a light probe. As usual, the thoughts were a shimmering, amorphous mass, virtually impossible of precise analysis, but there was an ever-recurring antagonism theme, more basic than mere disapproval of an erring employee. And, there was a fear motif. Deloran risked a quick, sharply directed thought.

The fear thread stood out more sharply, grading into hatred. Diore started to rise to his feet, his neck suddenly turning pale.

Crei waved him down curtly.

"Look, Mr. Diore," he said wearily, "you talk so loud and so long, you make my head hurt. I just think I'll go find myself a new boss." He turned to the door.

For an instant, a slightly dazed expression came into the executive's eyes. Then, he shook his head furiously.

"Deloran!"

"Yes?" Crei left his hand on the doorknob as he turned.

"You're finished here, of course." A note of satisfaction crept into Diore's voice to temper the anger. "And I don't think any other firm will take a very charitable view of your action in leaving us in this manner, especially without notice."

"Oh, I just gave notice." Deloran smiled gently. "Of course, you can fire me without notice, but it really won't make much difference. In fact, I'm not particularly concerned with your future actions. You can do whatever you wish. You see, I've just decided what I'm going to do, and you're quite powerless to do anything about that."

He closed the door quietly and walked out, past the switchboard, to the stairs.

It was funny, he thought, that he should have allowed himself to get into this position. It was equally funny that he should have put up with it for so long. He could have come out of hiding long ago, and saved all those years of monotony.

Now, he realized that his whole flight had been a ridiculous blunder. He had maneuvered himself into a pattern much more restricting than anything his own civilization could have dreamed of. In fact, he very much doubted that anything they could offer at Aldebaran Base could equal the frustrations that the average citizen of this primitive culture accepted as a matter of normal routine.

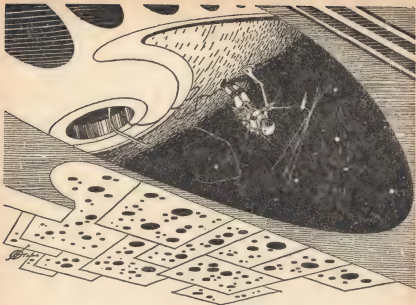
He turned from the gate and looked down the short street ahead of him. He looked at the drab, stone buildings, at the crowded pavement, then up at the clear sky. Finally, he shrugged and walked mechanically along the street.

At last he reached the city park. Slowly, he walked through the gate, past the little formal garden, and out to the edge of a wide, grassy plot. On holidays, it was a playground, crowded with people who relaxed from their usual routine. Today it was deserted. Today was a working day.

He looked across the wide expanse of grass to the mysterious depths of the trees on the other side. It was a bright cloudless day, and the dark shadows looked cool and inviting.

Then, he dropped his mental shield completely for the first time in twelve years. He aligned his thoughts on a commonly used band, and put all his energy behind the burst of thought.

"This is Delor Barcha, of Kleira," he thought intensely. "Come and get me. Please, come and get me!"



TRAINING AID

By WALTER L. KLEINE

There is, of course, a need for training aids in the operation of the immensely complex devices Man is now building. The ultimate training device, however . . .

Illustrated by Freas

GENERAL WYLER'S face was sharp and clearly defined in the communications TV screen, which meant that they were ready to start another training-testing series on us. Normally, all communications were blurred and fuzzy and full of the interference we'd actually run into when we took a real ship into space instead of going through the motions in a tin-can mock-up of what they claimed was going to be the shape and arrangement of the control and living compartments of the first genuine rocket.

The general had a different approach each time, probably more because the psychologists had told him that any slight variation would help us endure the prolonged confinement than because of any natural tendency to do so. This time he opened with a grin. "You know," he said, "I'm going to have to do something about my Monster Men"—his use of our slang for the Training Aid

Engineers was an obvious affectation—"or they'll build a spaceship before the authorized project does. I won't bother you with the details of the things they've done in the past; you've been through five years of training, and that covers just about everything they've ever done. You know perfectly well what they can do to your sense of reality.

"I imagine you've been wondering what your can was being tied to for the last few days. To be honest with you, I'm not even exactly sure what it is myself. If it does what they say it will, they've really outdone themselves.

"They claim to have put together a training aid which will duplicate every, and I repeat, as they always do, every condition you will encounter in actual space, and in the sequence you will meet it. Don't ask me how it's done. All I know is that they say it will work, and it costs twice as much as an actual working spaceship would have.

"You were picked to be the first to try it for the same reason that you'd be picked if we had the real thing ready to go. You're the most stable and best balanced of the ten quartets that are still in training.

"Your blast-off time will be 07:30 hours. You will be ready by then."

"We will be," I said.

We had been ever since they pulled our can out of the centrifuge-mounted nav trainer and started tying it down in this new job.

He broke the contact and I said: "Pre-blast check." It wasn't a necessary command, really; we all knew what we were going to do, did it in our sleep, for that matter, but some of the formalities remained.

We started with our own stations, then rotated around until everybody had checked everybody else. Not that we expected to find anything; we never did, but there was going to be exactly no room for error in actual space flight, and it *is* possible for a human being to make an error. We're all sure, without having been told about it or discussing it among ourselves, that if we make one error now, we'll be washed out as completely as if we'd flunked our first physical.

We worked in silence. Talking during checks was a habit you lost quickly in the Space Service. Besides, none of us would have talked anyway. We're all normally quiet-type personalities, and excessive talk was one of the things we didn't need.

The "talkers" didn't last long in this kind of training, for the simple reason that when you got to the point where four people were cooped up in a ten- by twenty-foot cylinder for an indefinite period, there wasn't much to talk about. That alone would be enough to drive a "talker" out of his mind—and quickly, too.

We were a really good crew; perfectly balanced. Two men, two women: Myself, Brad Raney, captain and first co-pilot; my wife, Jeri, pilot; Dan Lee, orbit engineer and second co-pilot; his wife, Myra, navigator and co-engineer.

We didn't meet by accident. The purpose of the Space Training Program was to funnel the trainees until only the absolute cream of the crop was left, and then to funnel the cream into the most compatible groups.

We funneled: Through the entrance exams that only one applicant in five hundred passed. Through the Basic Indoctrination and Testing that knocked out three of five of those. Through the long Intermediate Stage—centrifuge, weightlessness practice in two-place supersonic fighters diving and pulling out over a parabolic hump, three-concentric-sphere nav trainer, a dozen different

variations on isolation and confinement, emergency procedure, spacesuit practice and hours and hours in the classrooms. Through the Semifinal Stage—as many combinations and variations of the things we'd done before as the engineers could put together. And the standing joke about whether the Monster Men were eliminating us as fast as we were eliminating them.

They were eliminating us, but they must have lain awake for nights on end dreaming up some of the rigs they handed us. A hundred and fifty-three men and women survived that one, and the four of us had already met.

We were the first crew to fall together in final form, and we've protected that advantage.

Then the Finals—actual piloting of an undersized test model of the proposed first stage of the real ship; more and more complex groupings of the training aids as the Monster Men improved their technique; and final groupings and isolation in cans that were supposed to be exact duplicates of the interior of the three-stage rocket now under construction.

We had a double wedding in the second week of the Finals.

That was seven months ago. We've been out of the can once in that time—for ten minutes, to change to an improved can.

We were strapped down on our acceleration couches six minutes and thirty-seven seconds before blast-off. We used the time to recheck our equipment.

The unofficial motto of the Space Service is "Recheck."

The blast-off was just like any other, although neither of the bottom stages gave us any trouble, which was unusual. The Monster Men loved to stick us with a third stage that wouldn't let go.

They said it was good for promoting fast thinking and faster action. It was.

Myra checked the course and we were right on the hairline.

According to our instruments, we were five hundred and sixty miles up and traveling just a shade under seven miles a second. Our nav screen showed the stars ahead, the Moon off to one side, and the Earth receding behind. In four days, unless the Monster Men had other ideas, we'd be circling the Moon and heading back. Four more and we'd set down and get hauled out of this rig and stuck back into one of the routine jobs while somebody else took a trip to the Moon without ever leaving the Mojave Desert.

Don and Myra helped each other on with their spacesuits while Jeri and I began the Control Room check. Since Myra was the smallest, she got the job of crawling down among the fuel tanks and rocketmotors and checking for evidence of overheating, leaks, or other damage. Don stood by in case she got into any trouble.

She hadn't been through the air lock five seconds before her startled voice came tinnily out of the speaker in Don's helmet: "Hey! There's no air down here!"

He leaned close to the helmet and replied: "What did you expect? They said this was supposed to be a perfect illusion of a trip to the Moon, didn't they? After all there's no gravity, and that's a lot harder to pull off than just evacuating the air from around us."

"Yeah," she laughed back, "and how do you know they didn't actually tie us to the nose of a gen-u-wine gold-plated Moon-rocket and palm it off on us as a training aid? That would be a lot simpler than all the gadgetry they'd have to rig up to duplicate this on the ground, you know."

We couldn't help laughing. That was Myra all over. She knew when a joke would do some good, and she knew when to quit. She shut up and started making her check. She spent three hours down there against the one it took Jeri and I to do the upstairs check.

The swing out and around the Moon was strictly routine. Myra kept thinking up variations on her original joke to fill the gap left by the strange absence of Monster Man-made troubles, winding up with: "I suppose they get that out of a travel folder?"

"Where else, dear?" Don asked sweetly. "You can get them from any passing flying saucer, you know."

Whether that shut her up or she intended to drop it anyway, she never brought the subject up again.

The four days going back were strictly routine, also. We might just as well have had our can sitting on blocks off in some dark corner as taking up space in the Monster Men's gigantic training aid.

Jeri said as much during one of our informal conversations with them and asked: "Really, this is a training job but how come you haven't given us any emergencies to handle yet?"

"Hardly," was the amused reply, "but don't worry; we haven't forgotten you."

They still hadn't given us anything new when we hit the atmosphere. About all we could figure was that they wanted to see if we could hold up under sustained monotony under all conditions combined, without any of the usual problems to keep us occupied. It seemed like an awful waste of money to build a monster like this just for that.

The approach went off like clockwork.

We fully expected them to give us a structural failure at the first jolt of hitting the atmosphere, but everything held. The metal ribbon drag 'chutes popped out one at a time, in perfect order. Our speed dropped without any of the excessive heating we'd drilled so long to combat.

Jeri established a glide plan and rode the homing-beam right on down until the huge red-dyed square of sand of the landing area came into view on our screens.

We dropped through the sonic wall at five miles up and twenty out. A hundred feet up, two miles from the edge of the square, Jeri dumped the drag 'chutes and gave the ship full up. It came into balance tail down three thousand feet over the square, and she cut in the landing rockets.

She brought us down with scarcely a jar.

She relaxed and we went through the post-flight check. Nothing wrong.

We all felt a little let down. Putting us in a training aid like this and then giving us a complete milk run didn't seem right.

I turned on the communication screen and General Wyler's face filled it, sharp and clear, as usual. "How'd it go?" he asked, although he obviously knew perfectly well that it had gone without a hitch. He seemed to be holding back a laugh.

"Sunday School picnic," said Myra succinctly.

"How do you figure a milk run like this is going to do us any good?" Don wanted to know.

"Open the air lock and look outside," Wyler suggested.

We looked at each other. Jeri shrugged. "Let's," she said. "At least we'll find out what normal air smells like again." She flicked the fast-open switch on her control bank and led the way aft.

The air lock was open to the broad expanse of the Mojave Desert.

"Where's . . . but where's the training aid?" Jeri asked no one in particular.

I looked up along the slender nose and down at the puddle of molten sand which was gradually congealing around the tail fins. "I guess it wasn't," I said weakly.

"Never say I didn't tell you so," Myra said in a strangled tone.

I turned to look at her and she was white as a sheet.

I guess we all were.

THE ANALYTICAL LABORATORY

We've got the November and December 1954 issues to report on this month. And I might mention a preliminary report on the January issue in this respect; Tom Godwin's "Cold Equations" definitely didn't leave you readers cold; some of the letters show warm enthusiasm, and some show just plain heated reaction at the sacrifice of the girl. We'll discuss that further next time, though.

In the November issue, there's an interesting phenomenon in the points distribution. Here are the scores for the two issues, and note the difference:

NOVEMBER, 1954

<i>Place</i>	<i>Story</i>	<i>Author</i>	<i>Points</i>
1.	Question & Answer (Pt. 1)	Poul Anderson	1.82
2.	Operation Syndrome	Frank Herbert	2.12
3.	Neighbor	Clifford D. Simak	2.30
4.	Lone Bandit	Dennis Wiegand	4.45
5.	Wing Shot	Victor Stephan	4.53

DECEMBER, 1954

1.	The Hunting Lodge	Randall Garrett	2.14
2.	Question & Answer (Pt. 2)	Poul Anderson	2.23
3.	Pyramid	Robert Abernathy	3.03
4.	In The Beginning	Morton Klass	3.69
5.	The Disturber	Winston K. Marks	3.76

Why, I don't know—but the point scores fall into two sharply divided groups in the November reports; usually, as in December, there's a fairly smooth gradation. Any suggestions as to what caused the jump in the November reports?

Incidentally, Poul Anderson gets the 4c bonus rate on the November half of his yarn, and the 3½c rate on the December half. What you like, we pay for—so let me know what you like!

THE EDITOR.



THE CONNERS

By EDWARD PEATTIE

The scientist had reason to believe he was being imprisoned. But then, scientists occasionally fail to understand human attitudes . . .

Illustrated by Shapiro

PINE GROVE was about the same as all the other military research stations throughout the country. Jack Benson, approaching it along the highway, saw it looming larger and larger and felt his spirits sinking as it came. The week end in New York had given him an inkling of what life was away from an Army science installation and he had no desire to go back. He eyed the unmistakable signs of an approaching military post: the scattered pillboxes,

each with its Prony gun protruding menacingly; the scattered mine fields usually festooned with the carcasses of dead dogs who could not read the warnings. Then came the rows of tree barriers. Then emerged more barbed wire entanglements and finally the white buildings of the station itself. Then they turned a curve going up the hill and there they were at the gate. The command car drew to a halt.

Sergeant Griscom, his conner, turned around to face him. The driver looked straight ahead.

"We're here, sir."

"Where'd you suppose we would be?" growled back Benson, sourly. He derived a sardonic pleasure in deviling Griscom.

The sergeant refused to be disturbed and strode over to the guardhouse with their orders. He looked very military in his full-dress uniform with all his ribbons and he would have given a sharp salute then and there except that the guard was also a sergeant. He announced grandiloquently: "Reporting Dr. Benson, the big atomic physicist from El Centro, and I'm his conner, Sergeant Griscom!"

There was a pause as the helmeted guard leafed through the orders. Finally the sentry was satisfied and he withdrew into his pillbox. Overhead a loud-speaker began to blare forth: "Attention, visitors! You are informed that your presence at Pine Grove Research Station is a privilege and not a right. All Printed Signs must be followed to the letter lest serious damage result. Your temporary passes will clear you to one area alone and you are not permitted to visit anywhere else. Welcome to P.G.R.S.!"

Griscom came back with the passes and they drove through the gate. The driver, a squat immobile countryman, confided to the sergeant: "Day after day that same spiel. If it's a general or a guy driving a canteen truck, it's all the same. And every time that record breaks loose, the noise almost knocks me out of the car."

"Steady, son," cautioned the sergeant, "let's not get nervous in the service."

Benson sat behind them and thought what morons those military men were. Griscom had been with him almost two years and still made the same dull witticisms and clichés. Benson felt that he was a lot sicker of the military life than the driver. But national emergency and the fact that he knew too much kept him under military orders all the time. Benson gripped his brief case—his badge of science—and sulked. The car whizzed past endless rows of white buildings, some barracks and maybe even some laboratories. Then the thought struck Benson.

"Don't we have to make a courtesy call on the commanding general?"

"Naw," said the sergeant, leafing through his conner book. "Regulation 156 has been amended to require the visiting scientist to report first to the civilian group leader. Then he meets the military C.O. of the group. Then if the general wants to meet the techno, he sends for him."

"How about badges?"

"The guard at the gate gave us temporary badges which we have to wear at all times. Next week we'll be photographed and get our permanent badges. Now we check in at R-10."

The sergeant efficiently hopped out as the car stopped and threw open the door for the scientist. They entered the group headquarters, Benson leading

and Griscom following at a distance of two paces back and one to the right as required by Regulation 973.

The proceedings were about the same as at any other military post with the usual S.O.P. complications. They cooled their heels in an anteroom as a secretary disappeared behind closed doors for more signatures. But eventually they were led to a conference room where they met the project leaders.

They were two harried lean scientists, one gray and one blond, but both displaying the stoop of the introvert. Benson had heard of Dr. Candow who was a pretty capable nuclear chemist, and he recognized Candow's assistant as Dr. Sylcox who had been in his psychophysical course at Eastern Tech. He approached and shook hands with them. The conners of Candow and Sylcox, who had been seated on a bench by the door, greeted Griscom.

"Well," began Candow, "we've been trying to get you, Benson, for the past year but that drip down at El Centro, Colonel Krewson, wouldn't release you. Ever since the great job you did on selenium we knew you'd be the only man in the country to replace Knowlby."

"What happened to Knowlby?"

Candow began to stutter: "He . . . er . . . asked to be relieved. It's a sort of nerve-racking job here and we're under a certain amount of pressure until we unscramble the cobalt selenium problem." He nodded his head imperceptibly and Benson immediately understood. The conners were already taking notes.

"I think I'll like it here," enunciated Benson for the record. "How's the audio-frequency research?"

"Going on like mad," answered Sylcox, "just like anywhere else. But why don't you go over to the B.S.Q. and get settled? Tomorrow you can show up, meet the lab staff and look at your new laboratory."

"I will," answered Benson, realizing he was lying for one of the few times in his life. He was ready to shake hands with the two scientists again when one of the conners in the back of the room shouted: "Attention!"

The door swung open and in marched the group commanding officer. The three conners threw snappy salutes and the three scientists rose. The C.O. was a second lieutenant, thin, brisk and conscious of his dignity. His name was Steerforth.

"At ease, men," he condescended. "Glad to have you join us, Benson. The boys have been yelling like crazy to get you assigned to our group. Never was too much for this science detail stuff, but I know what we want here: A good bunch of producers who really put out and keep the higher-up brass out of our hair. Don't be afraid to speak up if there's any equipment or stuff you want."

"Fine, sir," said Benson, shaking hands, and feeling like kicking him. The lieutenant gravely put on his helmet, returned the sergeants' salutes, and was on his way again.

Sylcox broke into a grin. "Now don't be running down our boy just because he's A.R. We could get a lot worse officers for the job and you know it."

"I sure do," said Benson. "Colonel Krewson at El Centro is the most domineering oaf who ever walked into a laboratory. He's the sap who ordered all periodic tables hidden because they contained uranium."

"Well our boy's usually anxious to help any time we ask for anything, and the rest of the time he keeps out of our way. It works out better that way. So

get settled over at your quarters, and tomorrow we'll start rolling." Candow waved good-by and Benson and his conner left.

When they finally reached the Bachelor Scientists' Quarters, Benson felt relieved. He felt that he was among friends. But he also felt that this was the time to carry out his Plan. The Plan had occurred to him coming in on the plane that morning and had been buzzing around in his subconscious mind throughout the recognition ceremonies. The room was neat and plain and looked just like his cubicle at El Centro. He thought it would take a few months of living to make it comfortable and was pretty sure it would not get it from him.

Sergeant Griscom carried in Benson's small bag and told him his trunk would be in in the morning. The sergeant, like a born bellhop, turned on the lights, opened the windows and even turned down the bed.

"Did you really mean it, boss, when you told the longhairs you were ready to hit the sack?"

"Right!"

"Then maybe I might be able to mosey into town and see the bright lights. If you don't need me any more all right to sign you in for the night?"

"All right with me." The sergeant left gleefully and Benson felt tired and crafty. He went to his drawer and withdrew all the money he had. Then he undressed, put on his pajamas, selected Gatterman's "Wave Motion," a good heavy book, and waited in bed for Griscom.

"Are you O.K., boss?" asked Griscom, after an interval which Benson thought was an hour but was only about ten minutes. "I've gigged you in and got a one-day pass for myself."

"Sure; how about turning off the light?"

"Right away, boss," answered Griscom coming around to his side of the bed. Then Benson struck—

He hit the sergeant just below the ear with the large book and the soldier plummeted to the floor. Benson leaped out after him and placed his fingers on the deltoid artery, sending the dazed soldier into unconsciousness.

Then Benson had to act fast. He pulled off the sergeant's uniform and dressed himself in it. Next he bound the sergeant with his extra belt and placed him under the sheets in his own bed. He then removed Griscom's wallet and took only the sergeant's I.D. card and the pass to get out of Pine Grove. After examining himself in the mirror and reflecting that there was not much difference between a crew haircut and a G.I. haircut, he sat down to collect his thoughts and to decide what to take with him. His books were out of the question and so probably was his slide rule. His scientific notes would be useful to Sylcox and of little use to him outside a government installation. He thought of taking some blank papers, not knowing what the stationary situation was outside, but his eyes chanced to fall on Sergeant Griscom's "Conner's Handbook." That might do just as well and he always had been curious about what the conners thought of their bosses anyway.

Then he squared his shoulders, waved good-by to his unconscious mentor and walked out into the hall.

Section R-10 was going to be the hardest hurdle, he knew. The headquarters personnel had already met Sergeant Griscom and had even seen him for a few

minutes. This was a chance he had to take and he swaggered along the corridor, swinging his arms like a British grenadier. Candow passed him in the hall but the elder scientist was deep in thought and could not be bothered looking at all the soldiers on the post.

The conners or secretaries might have done otherwise but, luckily, he saw no one else before faring out into the late October sun. He reflected that it was the first time he had sallied forth without a guide in five years and savored every minute to the utmost. He had made a mental map of the route they had taken when they drove into the post and he mechanically retraced his steps, realizing that it took much more time than when with the car.

One thing worried him slightly. He had no idea how he would be able to get into town even if he were fortunate enough to get past the gate. No staff car was any longer at his disposal now that he was a simple soldier off on a pass. But he reflected with satisfaction that nobody cared about a simple soldier either. Anyway, the immediate problem was to crash the main gate. It took almost fifteen minutes for him to reach it but he recognized the little white house and heard the recorded voice screeching out its warning. He found a queue of soldiers and civilian employees waiting to be examined by the sentry. When it came to his turn, the bogus Griscom showed his badge with the aplomb of a thirty-year man. The guard took plenty of time scrutinizing the pass and finally nodded his head knowingly.

"You're new here, aren't you, Sarge?"

"You bet," answered Benson wondering if something was wrong.

"Need any numbers?" Benson almost gasped in relief. He was not interested in numbers at that time, but he figured the real Griscom would have been enthusiastic.

"Well, I'd like to see what I can do myself, but I'm willing to take some advice from the man on the spot. What kind of town is this Boonetown? Anything like Tokyo or Odessa?"

"Oh hell no, Sarge," muttered the sentry, apologetically eying the campaign ribbons of Griscom. "But there're some pretty nice chicks around here full of fun and ready to go."

"You talked me into it, Buddy," said Benson. "Name my poison."

The placated guard produced a battered red notebook and read off some addresses to Benson who copied them down in his conner book with thanks. Those waiting in line behind him grumbled in a resigned sort of way but were glad when Benson headed toward town.

A master sergeant near him struck up a conversation and Benson wondered how long he could play the role of a G.I. *One word about scientific terms and I'm sunk*, he thought, but the first words of the new sergeant reassured him.

"A new boy, eh? Probably a conner. Right?"

"Sure am, Sarge. How'd you pick me out?"

"Easy. A pretty bright boy with plenty of service who knows how to use his eyes and ears. How's your scientist?"

"Pretty good chap for a longhair," admitted Benson magnanimously, "but he gets grouchy sometimes and he kids me like crazy at others. You a conner, too?"

"Yeah, Doc Jackson. Sort of a slob."

Jackson, thought Benson. A good buddy of his and of Sylcox. He didn't even know he was at Pine Grove.

"Slob, eh," he continued. "Have to watch him much? Is he in with the Johnnies?"

"Well no, not that much of a slob. But the droopy boy keeps working in the lab half the night and I have to wait around, too, when I could be tearing off to town instead."

"Well my boy's O.K. about that. He knocks off at four every day and, as a matter of fact, he's hitting the sack right now."

Just then the bus came along and they began their ride to the city.

He was separated by the crowd from his new found friend but was lucky enough to find a seat in the back of the bus. Talking with the master sergeant had made him curious about Sergeant Griscom's private opinion of his boss so he started to read Griscom's "Conner's Handbook." The notes in this book were, he knew, the basis for the weekly reports the conners had to turn in to Security.

This book was only for the year 1990 and it amazed him to say the least. Griscom had religiously recorded in a labored sprawl almost every useless thing he had done that year and had missed entirely anything worth while. On the day when he had made his scientific reputation with his epoch-making discovery of the germanium cell, Griscom had written simply: "Boss looked tired this morning, but by noon was yelling like a sap. Stopped work at 1:30, called in Dr. Duncan and Lt. Probel and shook hands all around. Then he went home to bed."

All Benson's conversations with other scientists were carefully reported in ungrammatically incorrect detail but the conner had adopted enough scientific doctrine to avoid drawing inferences.

Otherwise he mirrored all the prejudices of the uninformed. Benson noted with relief that his monthly rating in Patriotism, Security Risk, and Devotion to Duty had constantly rated *Outstanding* in the monthly ratings. "Wonder what Griscom will rate me when he gets that gag off," he reflected gleefully. "Bet he'll cut me down to *Satisfactory* anyway."

So he relaxed and shut the book. He leaned back and enjoyed the rest of the ride into Boonetown. The military secrecy was, as far as he was concerned, a thing of the past. From now on, they could get another man for the germanium problem. He figured that he could retain the uniform for about two or three hours before Griscom would be found and start a hue-and-cry. Then he would change to civilian clothes and merge back into society as a nonscientist.

His reverie was interrupted as the bus neared the city limits. Just as a precaution, he thought, it would be better to get out before it reached his station and so he followed two passengers who alighted at the next corner.

Once out of the bus, he started to walk along Thurber Street to find a place that sold used clothing. New clothes could wait until he had severed all military ties. He found a shop with the proprietor standing outside and let himself be persuaded to buy a shapeless tweed suit that made him look almost like a professor. The proprietor was in a selling mood and also managed to unload a shirt and necktie, and when Benson emerged from the store with the uniform neatly packed in a box, he almost regretted the sudden completion of his short

military career. He knew that Griscom would want his uniform back and so he took the box to the post office and mailed it to Pine Grove with his thanks.

Then he headed for the Public Library as a refuge where he could collect his thoughts and plan his future adventures. Here he found a reading room where he scanned the daily paper and looked for things he had not bothered about for years such as Rooms for Rent and Automobiles for Sale. All these had been found for him under the benevolent despotism of the Army. But now he had to look out for himself and he liked it. "It's not as though I were an ordinary private going AWOL," he told himself. "The Army is always insisting that we are civilians and treating us as different from the others in the service."

So he made a list of cars for sale and examined his resources to see how much he had saved. It amounted to eight thousand dollars even after his recent New York splurge, and he felt it was enough to keep him going for a year at least before he had to



work again. But he also knew that he couldn't stay around town too long. He did browse around the library a little to look at the books. There were plenty of literary and economic works but the only physical science books he could find were even more elementary than those he had used at Eastern Prep just after he had been selected for science training. Probably this was just a small town library. Maybe the larger cities had more advanced works.

As he emerged from the library, he saw soldiers being marched down the street in a somewhat irregular fashion. He asked a passerby why.

"The M.P.s are checking every soldier in town tonight to look at their passes. Nobody knows why, but I hear a sergeant out at Pine Grove stole a payroll or something."

Benson laughed. "Probably serves the Army right."

"Yeah, I think so, too. Those soldiers and scientists out at Pine Grove will blow us all up some day." The man lapsed into sullen silence.

Benson thought he'd better hurry. Things were moving a little too fast for him just now. He headed toward the used-car lots in the southern part of town and found a salesman who was just closing up for the night.

"How much for this Super Tudor Jet?"

"Nine hundred ninety-five dollars, sir. Would you like a demonstration?"

"No, just show me the guarantee."

The salesman dug it out. Then Benson paid him the money in cash, to his amazement. This was the first cash customer he had seen since 1981 before the depression had slowed them all down. But the salesman did not complain. He merely handed over the title and keys and Benson signed his own name to them. Five minutes later he was out of town, pouring his jet auto along the key intercoast highway. After two hours he had traveled three hundred fifty miles and reached the southern turn-off. Here he took a winding road that brought him to Egmont, a town he had visited when he was a boy. It was still as restful as it had been then, with cool shaded streets and wide restful lawns. And almost every house had a *Rooms for Rent* sign outside. He remembered vaguely that his parents had friends named Wright here and he thought he would look them up.

It took time for him to dig into the reaches of his memory to recall where the Wright home was but eventually he guided his jet auto down the right street. As he had expected, there was a *Rooms* sign outside a neat white mansion set back behind rows of beautiful trees. It had not changed too much in fifteen years. Yet that time had seen three violent short wars and just as troubled peaces. His own parents had been killed when Chicago had been bombed in 1982, before the counter-destruction of Moscow had ended the second of the three wars. He had already started his technical education at that time but he remembered when the team of Army plus scientists had perfected new weapons and kept the invaders at bay and the wave of exultation that had swept through the academic halls with the news of victory. Yet he recalled that all this time his education and research had kept him apart from the civil world and he was glad to be back. And the Wright mansion had stayed unchanged with the times. It was almost like childhood back again as he walked up the flagstones and rang the doorbell.

Mrs. Wright opened the door and was amazed to see the twelve-year-old

stripling grown to a six-footer. She threw her arms around him and introduced him to the rest of the family. There were apparently always young children around just as there had been fifteen years before and Mrs. Wright looked only a little quieter and grayer than he remembered. Staying anywhere else was out of the question and he felt that he was as close to being home as he ever would be. He found also that the Wrights had not heard of his selection for science training and prudently decided not to bring up the matter at all.

He immediately described himself as a vacationing advertising man wanting to get away from it all for a month or so and was accepted without question. So he sank into pleasant oblivion, going fishing with the younger Wright children, talking about his parents to Mrs. Wright and, best of all, sitting on the wide veranda playing chess with Mr. Wright whose hardware store never interfered with his hobbies. He also let the Wrights introduce him in town and he fell pleasantly into the rut of mere existence. He used the age-old pretext of writing a book as his current goal in life and wisely banished formulas and equations from his mind.

Mrs. Wright found Benson a good listener and pumped him full of all the good-natured gossip of Egmont. She even told him of a mysterious man called Degas Rosecrans who was even suspected of being a secret scientist. At night, this recluse, who lived alone, was sometimes seen looking through a telescope and making cryptic notes.

"But don't talk about it too much," she told him. "He's really a very charming soul, full of poetry and kindness and he's loved by children and animals. We like him ourselves and what he does is really his own business."

Benson decided he'd like to meet Rosecrans when the right opportunity afforded itself. The town inhabitants were good simple folk and, as the week passed, he learned to like chatting with them on the park benches of the village square and listening to the problems of farming and commerce. The world of science and war seemed far away.

One night as he was eating dinner the youngest Wright boy came bursting in with a tale of wonder. A convoy of soldiers had driven in on land trays with protruding Prony guns and for twenty minutes had quizzed all and sundry about the whereabouts of a missing government scientist. They had finally gone off after Police Chief Morton had assured them that the missing scientist wasn't in Egmont.

"After the soldiers left, all the men jeered after them," concluded Ronny Wright. "We don't like soldiers." And his parents nodded assent.

Benson was glad to have his own feelings reflected and thought that if there were as many soldiers in Egmont as were in Boonetown, there would have been more reason for hatred. But he kept his counsel to himself and merely ate another slice of Mrs. Wright's apple pie. He was only thankful that another peril was past.

"But didn't the soldiers question Mr. Rosecrans?" Mr. Wright remembered the suspicions of the town.

"No, Pop," answered Ronny. "They listened to Tom Sykes telling about him and just laughed."

"That Sykes is a bad apple." Mrs. Wright was thoughtful. "Why don't they let that poor Rosecrans man be?"

"Don't know, old girl," smiled back her husband. "Sykes probably can't stand anyone who can read." The rest of the family joined in the laughter.

But others were not so reluctant to interfere.

At nine o'clock, the sixteen-year-old Wright boy came rushing in and shouted breathlessly: "They got him."

"Got who," puzzled Benson.

"Old man Rosecrans. A mob has got him and they're taking him over to the Guild Oak to hang him!"

"Why that's impossible," wondered Benson. "People don't do things like that."

"Of course not," chimed in the father. "They haven't for twenty years. Why are they doing it?"

"They say he's a scientist!"

"Jim," said Mrs. Wright, "you know he isn't. Try to get Chief Morton and save the old man!"

"I sure will. Say, Mr. Benson, is it all right if I borrow your jet racer to go to the chief's house?"

"Of course, and maybe I can see the men and hold them off a little. Then you can bring the police and stop them."

"Maybe you'd better not go over there," wavered Mrs. Wright. "You don't know those men too well yourself and there's no telling what they'll do."

"Now don't worry, Mrs. Wright. If anything happens, I'll come straight back. But I'll need Pete to show me the way to Guild Oak."

As Benson followed the boy along the paths and over the tree roots through the forest, he tried to guess why the townsmen were trying to lynch a scientist. Such coöperation with the military seemed unusual for the people who hated soldiers as much as the Egmont people did.

"Honest, mister," whispered Peter to him as he opened a barbed-wire fence to let him through, "Mr. Rosecrans is too square a guy to be a scientist!" He hoped that the boy felt the same about him.

Then they came to a clearing lighted by automobile headlamps. As he sent Peter home, Benson was conscious of the outlines of the Guild Oak towering above them. Legend whispered that the last Indians of the county had been hanged there by a populace tired of pillage. But now silhouetted in the light beams was the timid Mr. Rosecrans surrounded by a knot of angry men. The leader was, as he expected, the town's prize loafer and talker, Tom Sykes, and that beetle-browed rabble-rouser kept pointing an accusing finger at the cowering Rosecrans.

"You're wrong. You're wrong," protested the victim. "I'm studying astrology, that's all!"

"Astrology's a science," shouted the irate Sykes. "He looks through a telescope and calculates. Let's get him!"

Benson shouldered his way through the crowd and shouted, "You can't kill this man!"

"Why not?" shouted back Sykes who had started to uncoil a rope. "We don't want any of these saps wrecking our country!"

"No," echoed the others, some of his park bench friends. "Let's string him up before the soldiers get here and beat us to it!"

Benson raised his hands and yelled: "You don't want to kill an innocent man, do you?"

"No, but he's guilty!"

"What, of looking through a telescope?"

"No, but he reads books and calculates."

"He does, does he? Well, listen to this. This man's a phony. Let me ask him a few questions."

"Well, all right," grumbled someone cooler than Sykes, "but hurry it up. We'll give you five minutes."

That ought to help, thought Benson as he approached the fettered Rosecrans.

"Say, mister, are you a Ph.D.?"

"No unfortunately not, but—"

"Do you know what Planck's Constant is?"

"No."

"What's another name for sodium chloride?"

"I don't know. Please stop asking me."

"What do these words mean: Diazotize, differentiate, zygote, transes-
terification?"

The man was crying in confusion. "I tried to learn but I can't. I don't know. Please—"

"There you are, gentlemen. This man's an absolute fraud. He's been kidding the whole town pretending to be a scientist, but all he is is a fake." A sigh of relief rippled through the crowd. But Sykes was still troublesome.

"Let's hang him anyway for fooling us."

"Sure," yelled someone from behind and the pinioned Rosecrans was again pushed forward. What sheeplike idiots these townsmen are, thought Benson grimly and he knew there was only one thing left to do.

"Wait a minute," he shouted.

"What now?" growled back Sykes, who was ready to put the noose over Rosecrans' head.

"How'd I know he wasn't a scientist?" shouted Benson, trying to make himself heard over the tumult.

"How?" yelled back the mob.

"Because I'm a scientist myself and can prove it!"

"What?" Everyone started screaming. Someone released Rosecrans who had sense enough to fall back. Sykes rushed right over to Benson and looked him straight in the face with horrid disbelief.

"Here's my proof. A photostat of my degree. These identification cards and photo!"

"A *Government* scientist!" screeched Sykes. "You scum!" He swung dizzily at Benson who ducked and felt the breeze fan his cheek.

The scientist fell back momentarily, but he was clutched from behind and then the wave of humanity poured over him. He felt himself buffeted and hauled and tumbled and kicked and scratched until his whole body cried in lament. Then they left him alone—momentarily. Ropes had been criss-crossed around his body so that he could not move at all. Truncheoned as he was, he was stood on his feet and confronted by the enraged Sykes who swaggered up to him and started punching him again. This time he could not dodge. A blow

landed on his nose without too much force, but he felt blood running down over his mouth. The sap couldn't even hit right, he thought to himself.

Then as he teetered on the edge of unconsciousness, he allowed himself the luxury of an image of a nice quiet laboratory with a glittering xenon lamp and Conner Griscom handing him a cup of coffee. All over now, he thought, opening his eyes to the headlight glare.

They dragged him to the tree and stood him upright while the agile and enthusiastic Sykes adjusted the noose around his neck.

"O.K., boys," yelled Sykes, "haul away and we'll get rid of this world-wrecker."

Benson felt nothing for a minute as the slack of the rope rolled up his back. There was only an instant for silent prayer before he felt a tightening about his neck.

Then everything started to happen. Rifle fire broke out, Prony guns started to crackle and droning patrol jets started to swoop down from above.

Benson felt the pressure released and he toppled forward. Everyone started to yell and he heard glasses breaking around him. Dazed as he was he recognized the pineapple smell of Pacificator C. Over everything roared an amplified voice:

"In the name of the United States Army, I command you to lay down your arms and yield yourselves to the authorised representatives of the law!"

Benson tried to blink his eyes, but the glare was overpowering.

"Don't try to look for a minute, boss," said the voice of Sergeant Griscom. "Say something, anything, boss."

"Go to hell," said Benson in a reassured tone. "Nice to see you, Griscom!" He felt the bonds being cut and he was raised to his feet, battered but triumphant.

Over all rose Lieutenant Steerforth's voice: "We have Prony guns directed at you from all angles and any signs of resistance after the pacificator wears off will be dealt with severely. Overhead is a flight of O-77's who can drop more bombs if you want more trouble. Fortunately your victim has been rescued."

"But the guy's a scientist!" shouted a voice from the rear.

"He's an associate member of the United States Army. It's rebellion to touch him, and I'm taking the names of the whole lot of you." Lieutenant Steerforth's voice cut off and all that could be heard was the muttering of the immobilized mob.

Masked soldiers were now passing among the crowd, segregating the ring-leaders as instructed by Technical Manual 146—"Handling Mobs." Several Turbocarriers came through the forest for the prisoners. For Benson and Griscom, a helicopter hovered downward and Lieutenant Steerforth held the door open for them.

"Hop aboard, boys," he said in his normal voice, "and let's get out of this firetrap before the yokels start acting up again." The sergeant assisted him in and Benson limped to a cushioned seat next to the lieutenant. The latter poured them both a cup of coffee.

"But shouldn't I be under arrest," wondered Benson, "after all, I bopped my friend Griscom here and went AWOL?"

"Forget it," said the lieutenant. "We expect the scientists to act up now and then. That's one of the compensations for being a genius. If we'd known

you wanted a leave so much, we could have sent you and Griscom down to Miami for a month's vacation, as we're going to do anyway."

It took a little while for Benson to get things straight.

"But, Griscom," he apologized, "you're not going to forgive me for hitting you with the book?"

"Why not?" said Griscom. "I've been hit harder by the Johnnies."

"But why did all those people want to kill me?"

"Don't blame them too much. Think of the cities that were wrecked and the lives lost in our last four wars." Lieutenant Steerforth had lost his briskness and seemed thoughtful instead. "They blame the scientists for the A bomb, the H bomb, the Li bomb and the Prony gun!"

"Sure," echoed the sergeant, "and they remember the five years from 1965 to 1970 when the scientists ran the country. They threw all the politicians out of office, and won the war. But the people got tired of them and killed most of them off. They only started to train a few again to help out in the next war."

"But nobody ever told me," protested Benson.

"Why should they? Maybe the few scientists today would get together and take over again. They find out soon enough anyway, whenever they get back in civil life."

"And the training program?"

"Simple," explained the lieutenant, "all bright kids are watched and if their I.Q.'s are 140 or so, they're sent off to special prep schools to screen them for scientific aptitude. If they pass, like you did, they go on to the Ph.D. like you did. If they're just half good, they become second lieutenants like me," he smiled in a half-ashamed manner.

"And if they're not worth a tinker's curse, they go in the Army like me," grumbled Griscom cheerfully, "and fight in the wars that guys like Lieutenant Steerforth plan and you furnish the stuff for."

"And how about the folks at home?"

"They hate us all! Even your friends, the Wrights, are probably trying to apologize for you all around town right now."

"Then the conners—"

"Why sure; they're assigned to the scientists to protect them from the plain folks. What did you think they were for, anyway?"

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JOVE INTERVENES

By R. S. RICHARDSON

For all our precision clocks, we still need to tie time down to the Great Clock of the Solar System—and star-occultation becomes important. But frustratingly difficult!

WHEN Heinlein first saw the coudé room at the 100-inch telescope on Mount Wilson he said, "This looks exactly like the inside of a spaceship."

The place does have an out-of-this world look about it. I have always thought that it would make a fine setting for one of these horror pictures. The high walls are painted black and set so close together you feel you are in danger of being crushed between them. Instruments of curious design, obviously intended for no good purpose, meet the eye on every side. The drum-shaped polar axis of the telescope projects from one side of the room like the barrel of an enormous cannon. There is an opening a couple of feet wide in the center for looking at the stars. (This would probably be the best place to dispose of the body.) I would shoot my picture with all the lights out except for the dull glow from the red safety lamp. The astronomer is peering into the focal plane searching for his star field. Camera moves in for medium closeup. Suddenly the astronomer's frame tenses.

"Here it comes!" he yells to his assistant upstairs at the control desk. "Let it drift. All right—clamp!"

The relay snaps with a noise like a pistol shot. The astronomer remains staring into the focal plane his eyes grim—watchful. Low rumbling sounds and flashes of light as the dome turns.

Cut.

I wrote in my notebook: *Occultation of Sigma Arietis by Jupiter, November 20, 1952 Coudé focus 100-inch.*

We had been anticipating this event for a month. It seemed like a splendid opportunity to test the camera which we wanted to use for taking motion pictures of Mars when it is close in 1954 and 1956. Over at the 60-inch telescope they were going to observe the occultation with a photomultiplier system. The sky was clear and the air calm. It looked like a good night.

Formerly occultations had been observed chiefly because they furnished an accurate check on the position of a planet in its orbit. We keep track of the planets by measuring their positions with reference to the fixed stars. Obviously it is desirable to have the comparison stars as close to the planet as possible. An occultation should, therefore, be ideal for this purpose. You will find references in the literature to dozens of observations of occultations of stars by Venus, Mars, Jupiter, and Saturn. Usually they consist merely of the corrections to the planet's predicted position and a few remarks about the seeing. In other words, in the past when observing an occultation astronomers have been concerned solely with the geometry of the situation and not at all with the physical condition of the bodies involved.

In the last few years electronics has changed all this. An occultation has

become an event of much more importance than before. No longer are astronomers concerned primarily in determining how far a planet is out of its path. Now the feature of importance is not so much *when* the occultation occurs but rather *how* it occurs. For the way in which the planet cuts off the light from a star can be made to give us valuable information about the planet's atmosphere. And information on the atmospheres of the planets is mighty hard to get. We have detailed knowledge of the elements in the atmospheres of stars hundreds of light-years distant, but what makes up the atmospheres of the planets is still largely a matter of conjecture.

The first thing an astronomer does when he goes to work at night is to focus the telescope. He usually does this by setting on some bright star near the object he wishes to observe. On this occasion the object we wished to observe could also be used as a focus star. We got a surprise when Sigma Arietis came into the field of view for instead of one star we found two—a blue one and a yellow one—so close together they seemed almost in contact.

For a little while it looked as if we had discovered one of the most remarkable binary systems in the sky for after only a few minutes the stars had noticeably moved apart. Then it dawned on us. The yellow star was not a star at all but one of Jupiter's satellites. Since the satellite reflected the light of the sun it appeared yellowish in contrast to the white-hot Sigma Arietis. Later we got a report from Poland that the satellite was Europa and that it had occulted Sigma Arietis itself about the time we were eating dinner. A sort of warmup for the main event later on.

After focusing the telescope we decided to take some test exposures to make sure the camera was operating properly. Although the occultation would not occur until 2:52 in the morning we did not want to take any chances of a breakdown at the last moment. We felt pretty sure everything was all right with the camera. Still it was a good idea to make sure. So we took a few dozen exposures on Jupiter and developed the film. The images were a mess. Jupiter appeared to be coming apart at the seams.

We tinkered with camera and took some more exposures. This time Jupiter came through in little pieces like the fragments of an asteroid. Investigation revealed that the sector which controlled the interval between exposures was sticking. As there was no hope of repairing it at that late hour we had to insert another one that operated at a different rate. This was a severe disappointment as now the fastest we could take exposures was one every three seconds instead of one a second as planned.

By the time the new sector was in and the camera back on the telescope again it was eleven o'clock or minus three hours. But now test exposures showed Jupiter all in one piece at least. We started the camera operating automatically taking one exposure a minute while we sat back to wait for the occultation.

While the camera was clicking away we followed the progress of Jupiter toward the star through an eyepiece which used a little light diverted from the main beam. This eyepiece when used with a focal length of two hundred fifty feet at the coudé gives a magnification of 1500 which is fine for guiding purposes, but the image so formed is fuzzy and bloated and shows only the coarsest planetary markings. (Whenever we wanted to know how a planet really looked we had to use a six-inch refractor about a quarter of a mile from

the 100-inch dome.) Occasionally, however, we got a startling view of the Jovian satellites in action.

Under a magnification of 1500 these little bodies move so rapidly that they give the impression of being artificially controlled. The first time one popped into view I thought a volcanic eruption was under way. There was a protuberance at the limb which kept swelling up as if a big chunk of matter was arising from the lower depths. After a few minutes the mass detached itself from the surface and went soaring leisurely over the planet. I followed it for about thirty minutes until it vanished outside the field of view.

About midnight we began to wonder if there was going to be any occultation or not. From the way Jupiter was headed it looked as if the planet might miss the star altogether, which would be a good joke on the Celestial mechanicians. By one o'clock, however, all doubts were dispelled. The southwestern

Figure 1. Geometry of the occultation shown to scale. Jupiter's apparent motion, indicated by arrow, was 15.6° south of westward.

side of Jupiter was going to plow into Sigma Arietis just about as predicted. (Jupiter was retrograding at that time.) By two o'clock Jupiter and the star were visible together in the eyepiece and the tension in the coudé room began to mount perceptibly.

We had decided to start the camera running automatically at top speed when Jupiter was about one inch from the star. We could, of course, calculate the time when the star should reach this position, but we dared not rely on the predicted time too heavily. If we started too soon, we might run out of film before the star was occulted, a horrible thought. On the other hand, if we waited too long, the star might suddenly vanish before we even got started, which would be still worse. It was my job to follow the course of events in the eyepiece while one astronomer kept an eye on the camera and another watched the chronometer.

At minus ten minutes the star was getting so close that I lost my nerve and gave the go-ahead signal. Then I concentrated on trying to determine the moment when the star disappeared. Several times the star seemed to flicker as if it were about to go out but always it came back again. It looked like a soft white ball melting into a snowbank. At 2:46 I thought sure it was gone. Not until two minutes later did it disappear for good. According to our observations, the occultation had occurred three minutes forty-eight seconds ahead of time.

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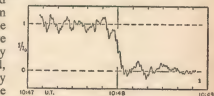


Figure 2:1. Observed light-curve for σ Arietis at the time of occultation.

proceedings. But it seemed there had been a hitch at the crucial moment. I have always been a firm believer in the perversity of inanimate objects and now my worst views on the subject were fully confirmed. The camera had run smoothly until a few minutes before immersion when the bearing on the feed reel had taken a notion to freeze so that the belt which moved the film had to be urged along by hand. As a result, we couldn't be sure whether we had observed anything or not.

Over at the 60-inch telescope we found that the photoelectric people had been having their troubles, too. Around the time of occultation some of the controls had not functioned properly causing the telescope to drift at a much larger rate than usual. Only cheerful note was that we agreed within twelve seconds on the time of immersion, which is remarkably close, as an occultation is hard to observe accurately. They had also noted fluctuations in the brightness of the star shortly before disappearance.

It was now about 3:30 and the only remaining event on the program was to observe the time of emersion scheduled for 4:41. Since Jupiter would be so far west by this time that it would be beyond the reach of the large telescopes, we planned to do our observing with the 150-foot suntower telescope which commanded a clear view of the western horizon. The only other possibility was the six-inch refractor, but the trouble there was we would have to observe Jupiter through an oak tree which seemed like poor technique. So we had decided—rather ambitiously—to use the suntower.

Now this telescope had been designed for the specific purpose of observing one star only—the sun—and to observe any other object with it is beset with numerous difficulties. This instrument cannot be aimed at an object like an ordinary telescope. Instead you first must pick the object up in a coelostat mirror which turns at half the angular rate that the sun moves westward across the sky. The coelostat mirror sends the light onto a second mirror, which in turn reflects the beam down onto a lens of one hundred fifty feet focal length. It is this lens that forms an image of the object in the laboratory at the base of the tower. The mirrors can be set for the sun easily enough which is so bright that you can see the reflected beam and know exactly what you are doing. But it is another story when you are working in the dark with the feeble light of a star.

We had already made a dry run at the suntower to that all would be in readiness on the morning of the twentieth. Picking up Jupiter had not been as difficult as we had expected. After only about twenty minutes search we had the mirrors set and the planet in the eyepiece at the bottom of the tower. We had then marked the position of the mirrors carefully and stopped the clock. To find Jupiter later it should only be necessary to start the clock at the same time and to reset the mirrors. (They had to be used in observing the sun during the day.) We had told one of the day observers that he would be performing a great service to astronomy if he would get up in the middle of the night and set the mirrors for us before we reached the suntower.

When we arrived at the tower we found the day man waiting for us looking haggard and disheveled. He had dragged himself out of bed and faithfully followed our instructions about starting the clock and setting the mirrors. Only there was no Jupiter. That little pale spot of light simply refused to come down the shaft.

So two of us took the elevator to the top of the tower to look at the mirrors while the day observer stayed below. Jupiter was plainly visible in the coelostat mirror. After some maneuvering we got the second mirror adjusted so that it unquestionably reflected light in the general direction of the lens beneath it. By lying on your back with your head sticking out over the 150-foot shaft you could see the planet shining serenely among the stars of Aries the Ram. By all the laws of optics there should have been an image of the planet at the bottom of the tower. Except that the day man down there couldn't find it. We tilted the mirrors east and west and up and down and ran them to the north and south. We went through the most varied contortions trying to track that beam into the lens. It was infuriating to see the planet shining right in front of us without being quite able to capture it.

Time was running out. The emersion was due in another half hour. We

could either gamble on being able to pick up Jupiter in that time or give up and try the six-inch. We decided to try the six-inch. At least we could aim that instrument at Jupiter even if there was a tree in the way.

To our surprise the view through the oak leaves turned out to be pretty good after all. But by that time we had gotten into a gloomy state of mind in which nothing seemed to matter any

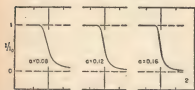


Figure 2.2. Theoretical light-curves corresponding to inverse scale heights of 0.08, 0.12, and 0.16.

more. On top of the tower the minutes had seemed to fly past but now they dragged interminably. The thought of our nice warm bed waiting for us with nothing to do but sleep till noon was irresistible. We began to have serious doubts as to whether Sigma Arietis would ever come out from behind Jupiter. The planet had rolled from the sky forever. While indulging in such pessimistic speculations the star suddenly popped into view nearly three minutes ahead of time. Jupiter certainly was not running according to schedule that night.

A few days later when the film came back from the laboratory we were gratified to find some two hundred images upon it covering the entire event. The most interesting feature was the fluctuations in brightness of the star which we had noticed in our visual observations. Since it is impossible to make a reproduction that shows these as well as they can be seen upon the original negative I have made estimates of the intensity of the star image on a scale of 1 to 10 which are given in Table I. The interval between frames is about 3.5 seconds.

These fluctuations in brightness may originate either in our own atmosphere or in the atmosphere of Jupiter. A close examination of the star and planet before immersion, however, indicates that our atmosphere was fairly steady. It seems reasonable to suppose, therefore, that the fluctuations from frames 174 to 186 arise from turbulence in the atmosphere of Jupiter. Such violent turbulence in the Jovian atmosphere is not so surprising when we consider the rapid changes that often occur in the surface markings.

We had hoped to fix the time of immersion very accurately from the photographic record, but here all our efforts came to naught. No amount of numerical juggling would yield a value that came within minutes of the

time determined visually. We tried stretching the diameter of the planet and varying its oblateness, but there was nothing we could do that would help enough. That pesky bearing on the feed reel had done more damage than all our mathematics could overcome.

TABLE I

Brightness of Sigma Arietis Before Occultation by Jupiter					
Frame	Brightness	Remarks	Frame	Brightness	Remarks
126	10	—	180	1	Faintly visible
166	8	—	181	1	Faintly visible
173	4	—	182	0?	Trace?
174	1	Barely visible	183	0?	Trace?
175	2	Distinctly visible	184	0	Gone
176	0	Gone?	185	0	Gone
177	1	Distinctly visible	186	1	Distinctly there
178	0	Gone	187	0	Gone. Not seen again.
179	1	Barely visible			

Much more valuable were the results obtained with the photomultiplier system at the 60-inch telescope. So far as I am aware this is the first time that the composition of a planet's atmosphere has been determined from observations of this kind. They constitute a striking example of the power of photoelectric photometry over the eye and the photographic plate. The method of observation cannot be described here except to remark that it was of an ingenious nature which differed from conventional photoelectric photometry. The main points in the analysis, however, can be followed without difficulty.*

Let us start by comparing the occultation of the star behind Jupiter to the setting of the sun below the horizon. As the sun nears the horizon two effects come into play which act to diminish its brightness. One is the increasing density of the atmosphere which causes the rays from the lower edge of the sun to be bent or refracted upward more than those from the upper edge. It is this difference in the refractive power of the atmosphere which makes the sun appear so flattened at sunset. The flattening reduces the luminous area of the sun's disk and so diminishes its brightness. The other effect is the extinction of light due to scattering by the air molecules. Scattering is such a powerful factor in dimming the light of the sun that refraction is insignificant by comparison.

In the case of a star seen through Jupiter's atmosphere, however, the situation is just reversed. Now differential refraction becomes such a dominating

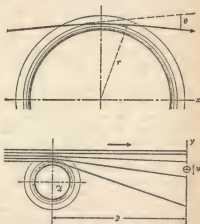


Figure 3. Refraction (above) and the resulting divergence of rays (below) due to Jupiter's stratosphere.

* W. A. Baum and A. D. Code, "A photometric Observation of the Occultation of Sigma Arietis by Jupiter." *The Astronomical Journal*, Vol. 58, pp. 108-112, 1953.

factor that molecular scattering can be neglected. This does not mean that the gases in Jupiter's stratosphere are exceptionally transparent. It merely means that the light of the star begins to be appreciably spread out by refraction in passing through these gases before dimming by scattering becomes significant. Refraction is important principally because of the vast distance between Jupiter and ourselves. The light of the star instead of being concentrated in a single beam is spread out over a great distance so that it becomes much attenuated and weakened.

How much the beam from the star is weakened in passing through Jupiter's stratosphere depends among other things upon the mean molecular weight of these gases. Knowing the relative motion of the Earth and Jupiter it should be possible to calculate from theory the shape of the star's light curve as the planet passes in front of it. The only unknown of importance is the molecular weight. Thus the method consists in assuming different values for the molecular weight and calculating light-curves for them. These theoretical light-curves are then compared with the observed light-curve. The one that fits the best gives the molecular weight of the gas.

Taking the temperature of the Jovian stratosphere as 86° K and the surface gravity as 2.65 g, the light-curve that gave the best agreement with the observations corresponded to a mean molecular weight of 3.3. Despite the uncertainties involved it seems impossible to get a molecular weight very different from this value. For example, a molecular weight of 16 corresponding to a pure methane atmosphere gives a curve completely at variance with the observations.

The only conclusion that seems possible is that the atmosphere of Jupiter is composed almost entirely of the two lightest gases hydrogen and helium. These gases had not been identified before, because, unlike ammonia and methane, they do not give strong bands in the observable region of the spectrum. Recently, however, a dark marking in the spectrum of Uranus and Neptune has been identified with a band due to molecular hydrogen. The observations indicate also that in the atmospheres of these planets the ratio of helium to hydrogen is about 3 to 1. If helium and hydrogen are present on Jupiter in the same ratio, the mean molecular weight of the atmosphere would be 3.5, in excellent agreement with observations.

Baum and Code also investigated the influence of diffraction on the light-curve and found it to be so small that it could be safely neglected. Just to make sure there were no other loopholes left open they calculated the gravitational displacement due to relativity on a ray of light grazing Jupiter, a calculation incidentally which Einstein had made himself about forty years earlier. Needless to say it is far too small to be observable.

Here we have an example of how fiction is compelled to change to conform to science. Methane and ammonia now appear to be merely impurities in the clouds of helium and hydrogen that mask the surface of Jupiter. Henceforth explorers who land on Jupiter will have to contend with these inert gases which, although useless for breathing purposes, at least are not acutely toxic. But a leak in their oxygen equipment should certainly be dangerous with all that hydrogen around. Thus observations made in November 1952 in a single minute have not only altered our conception of conditions on Jupiter but will also exert a certain impact on literature, as well.



THEY'D RATHER BE RIGHT

By MARK CLIFTON AND FRANK RILEY

Part III of IV. *They could have eternal youth—at a price. But the ultimate frustration lay in this: only the bums, the ne'er-do-wells, could bring themselves to pay that price!*

Illustrated by Freas

SYNOPSIS

In a San Francisco skid-row hideout, Joe Carter, a telepath, was conducting an extraordinary experiment in psychosomatic therapy. He was being assisted by Jonathan Billings, formerly dean of psychosomatics at Hoxworth University, and Duane Hoskins, former professor of cybernetics at the same university. They were using a machine, nicknamed Bossy, which had started out as an improvement upon the guided missile principles, but which had developed into a cybernetic machine superior to the human brain. Billings had fed his knowledge of psychosomatic therapy into Bossy's memory storage units. Due to the speed with which she could operate, Bossy quickly outstripped him in techniques.

Old Mabel, who rented them quarters in the belief that they were merely harmless counterfeiters, became their first test patient. The men were astonished to find that, after some days in hypnotic trance, far more than Mabel's arthritis was being lifted. Working psychosomatically on a basic cellular level, Bossy had restored the cells' youthful vigor, and Mabel was being transformed from an old woman into a beautiful girl.

While Hoskins slept, and Joe was walking the streets of San Francisco to organize his thinking in view of these developments, Billings left on watch beside the machine, fell asleep. Mabel, whose therapy was finished, roused: and being now without knowledge of inhibitions she walked out onto the street completely nude.

She was arrested and taken to the city jail. There a comparison of her fingerprints caused consternation. Obviously she was a young and unidentified girl, about twenty, but her fingerprints showed that she was Old Mabel, a well-known character, who had been first arrested more than forty years previously, and better than thirty times since then.

Dr. Eustace Fairfax, police psychiatrist, disregarded the evidence of the fingerprints, Mabel's own statements, and other evidence. He pronounced her insane.

The story leaked out to the newspapers, and they played it up sensationally as a discovery of immortality. Frenzied crowds gathered at the jail, and the city's most powerful firm of attorneys appeared at Mabel's bail-setting hearing in her defense. These attorneys routed Dr. Fairfax and the prosecution. From reading their thoughts, Joe learned they were representing Howard Kennedy, the multi-millionaire industrialist, who had previously tried to contact them about Bossy. Joe went to see Kennedy.

Although his intentions were constructive, Kennedy was, in effect, holding Mabel as a hostage for Bossy. He had spent his life building his great wealth in hopes of setting up laboratories and foundations where free scientific thought might flourish during the dark ages when thought in all other places was stultified by opinion control from powerful men in the government who had dictator ambitions. He was beginning to realize that his son was too weak to carry on this empire, and he thought to obtain rejuvenation for himself, through Bossy, in order to carry on his great work.

Joe disillusioned him about Bossy's ability to help anyone who clung to a fixed opinion, whether that opinion was noble or base. But Kennedy's attitude was still constructive, and he took Joe, Bossy and the professors under his protection. Joe brought Carney, a skid-row character who had assisted them, along with them when the police escort came for Bossy.

Part 3

XIV.

WHEN Howard Kennedy's office asked for a police escort, it was given without hesitation and without question. Both Billings and Joe were amused at Carney's open delight in the situation. They were still hunted on a nationwide basis, the hunt centered in San Francisco where they were thought to be; and the police escort took them through the rigid Bay Bridge check points without pausing.

A quick sampling of their minds told Joe that none of the men knew it was Bossy and Hoskins in the armored truck, or Billings and Joe in the car behind. They had their orders, they were carrying them out.

At the city boundary, the alerted Berkeley police joined the caravan, and with a flourish escorted it through the city and up into the hills beyond, to the front gates of the Margaret Kennedy Clinic.

As the gates swung wide, Carney surveyed the lovely buildings and landscaped grounds inside the fourteen-foot walls with awe.

"This ain't Howard Street," he conceded.

The Margaret Kennedy Clinic had transformed the most wistful dreams of earlier clinics into a reality. It covered a thirty-acre expanse with completely functional buildings. The shape and design of each had been dictated by the purpose it was to serve—forty separate units, covering every imagined phase of medical therapy, were blended into one harmonious whole. Completed five years ago, in memory of Kennedy's wife, both its original cost and its upkeep was enormous.

It was one of Kennedy's islands of rational research in a sea of chaos.

They were assigned one entire wing in the psychotherapy building. The armored truck pulled up to the service entrance and the institution superintendent, himself, was on hand to greet Hoskins as he clambered stiffly out of the body of the truck.

Superintendent Jones personally supervised the transfer of Bossy to a suitable room next to the amphitheater—where it was hoped by all the staff of the clinic that frequent demonstrations of Bossy would be given. Super Jones maintained an admirable attitude of this was all in the day's work, but his eyes probed behind the slats of the crate for a preview. He seemed torn between a desire to keep Bossy no more than a cybernetic machine, and a hope that Bossy would suddenly begin spouting long and learned formulae to solve the enigmas of the world.

His curiosity transferred itself to Joe when it was that young man who asked, almost immediately, to see Mabel. His curiosity was heightened when both Billings and Hoskins seemed to take it for granted that Joe had the prior right to see her. Along with the rest of the world, he had always assumed the student in the case, Joe Carter, was a nonentity.

The attitudes of the two professors toward Joe caused a rapid shift in his evaluations.

At a confirming nod from Super Jones, Mabel's attending doctor opened the door for Joe to enter her apartment. Mabel had been asleep when she was transported from the ambulance to his care. She had slept all through the day. His orders had been to confine himself to her physical needs, should any arise; but he did not lack desire to know more about her. He took it for granted he would be present, as attending physician, through Joe's interview.

It took a repetition from Super Jones of orders from Kennedy's office, that Carter was to be given every coöperation with no questions asked, to get his agreement to stay outside.

Joe closed the door behind him and stood alone in the small sitting room of an apartment which had been fitted for the convalescent needs of a very important person. Both his mind and his physical eyes were on the doorway

to the bedroom. He was about to walk across the room and go through the doorway to sit by her bed, when Mabel appeared. She was wrapped in a bright dressing gown which flowed about her perfect body in iridescent color. Her short mahogany curls picked up the light and seemed to glisten in accompaniment to the sparkle of her eyes.

"I've slept," she greeted him simply. "And this time, I know I'm awake. I'm still not quite sure whether I was before."

She said it, but her lips did not move!

Her mind crept into Joe's—and fitted there as trustingly as a child's hand.

Banished since childhood, along with his self-pity for his loneliness, the tears sprang into Joe's eyes and misted his physical vision. His psi vision swooned with an incredible delight. It was as if he had heard a true human voice for the first time in his entire life, as if music he had always known should exist flooded his being. It was as if he suddenly had wings to zoom him to dizzying heights in perfect intricate and controlled designs of flight. It was as if— There was no vocabulary, none at all.

"Not so fast," she laughed delightedly, and a little fearfully; the way a child laughs when it is tossed in the air by its father in the nightly coming-home game. "I'm not very expert yet. I got the impulse. I thought I would try. Bossy hasn't much material on multi-valued physics, and single-valued physics doesn't provide for telepathy at all. So I can't—"

Joe stepped over and took her hands physically in his. Mentally they had already joined hands. He was excited to find, even in the midst of his greater excitement, that he received two separate pleasure sensations from the two kinds of contact with her.

There were two distinct levels of thought, too. There was the psi exploration, now tentative and careful after the first exultation. Her mind was as cool and clear as mountain spring water sparkling over rocks in the sunlight. Her mind was as mysterious as a mountain pool found unexpectedly in a grove of trees and ferns, a pool shading deeper and deeper blue to a bottomless depth.

The other level of thought was verbal.

"Multi-valued—single-valued physics?" he asked. "I don't understand."

They stood in the middle of the floor, their hands clasped, looking into one another's eyes.

"Neither do I, completely," she said. "Neither does Bossy. There isn't sufficient data. But Bossy postulates multi-valued physics as being necessary to avoid the confusion and enigmas of single values."

"I'll have to ask Bossy about that," he smiled.

He could feel her mind probing his, a little awkwardly, a little timidly, as if she were not quite sure she would be welcome. She, too, was functioning on at least two levels. With a skill he had never known he possessed, he opened his mind wide, like a door flung open in glad welcome.

And easily, naturally, she came into his arms.

XV.

The following morning they were visited by one of Howard Kennedy's publicity experts.

"I'm Steve Flynn," he told them, and shook hands heartily with Billings, then Hoskins, and, because a good publicity man never overlooks a bet, with Joe. "We're letting one of the wire services scoop the world by having their master-mind sleuths discover you boys and Bossy are responsible for this immortality deal. My assistant is bringing them in a few minutes for some exclusive pictures. Don't try to do any explaining of anything. I'll hand out what we want them to know."

"I don't think publicity is advisable—" Billings demurred.

Steve Flynn looked at him incredulously.

"Oh, brother," he groaned. Then as if reasoning with a small child, "The boss promises you he's going to quash the indictments against you—right? He tells the Legal Department to get it done—right? But even the old man can't tell the United States government what to do—right? The boss says do it, but it's up to us to get it done—right? The boss knows we got to take certain steps. The Legal Department will get the indictments quashed as per orders, but they've got to have something to work with. We got to make you popular with the public. There's got to be a spontaneous, grass-roots demand for justice. How do you think spontaneous demands for justice get going?"

"But won't we be arrested immediately the story breaks?" Hoskins asked.

Flynn turned his high-powered personality on the cyberneticist.

"Look," he said reasonably, "the wire services don't jump through the hoops for us publicity boys because they love us. They got to get something out of the deal, too. They think it's time to bring up the issue of freedom of the press. They've been looking for something big to hang it on. This is made to order. They'll stand on their rights to keep their sources secret. They'll get their big hoopla, some politicians will get their names in headlines trying to make them tell, we'll get our publicity, and you're snug and safe. Everybody's happy—right?"

"I am not happy," Billings objected. "All this publicity! It's . . . it's hardly in the best of professional ethics."

"Oh, brother!" Steve Flynn groaned again. He spread his legs apart, and leaned forward earnestly. It was obvious he had been triggered on one of his favorite topics.

"Look, you guys," he said irreverently. "Why don't you scientists come down out of the clouds? You got to have publicity, man. Look . . . look what happens. You guys spend half, three quarters of your life holed up somewhere. Then you finally discover something. Maybe it's important," he shrugged. "Maybe it isn't. I wouldn't know. So you make a timid little announcement to a couple dozen long hairs at some meeting."

He took out a cigarette and lit it with a gold lighter which made a loud snap.

"Then you go back to your hole and die quietly. Nine times out of ten that's the last of it. But, say you're lucky. Say it's picked up by some desperate newspaper science reporter. Say you're still lucky, that you hit a long shot. Say the commentators pick it up. Now these commentators, they just about know a test tube from an aspirin tablet. But they got opinions. Got opinions? They make opinions, brother!"

He spread his hands wide before the fascinated eyes of Billings and Hoskins. Clearly the gesture covered a vast area.

"All over the country, all over the world, maybe, they rush to the microphone to tell people what to think about this discovery. They hash it over, forwards and backwards. Maybe they think it is good for a full thirteen minutes; maybe only to lead up to the first commercial. And each one of them has his own opinion—right? What happens?"

He shrugged again, as if the answer were self-evident, and because he saw by their expressions it was not, he spelled it out for them.

"The people get confused at hearing these different opinions. The more they hear the more they get confused. When you get people confused, they get sore. Best way on earth to make a guy sore, give him a slow burn. But they don't get sore at the commentators. They get sore at the idea, itself. They get sore at science, itself. They get sore because somebody says he can think straighter than they can. They get very sore when you tell them that. They don't like it. They don't like the guy who can do it."

He grinned then, and winked at them—man to man.

"Besides sex, the one thing the public does best is get sore. When you get sore you look around to find something to be sore at. So either they get sore at you, or they get sore at the guys who're against you. But you got to tell them which it is to be, because they don't know. Trouble with you scientists is, you don't know anything about people, not anything at all."

He waved his burning cigarette in the air.

"You know what?" he asked conversationally. "Every time there's a grant for research, they ought to make as big a one for the publicity to sell it to the public. That's the only way you're ever going to make thinking popular. How are you going to make thinking popular unless you popularize it? It stands to reason. You got to get out there in front and give your pitch along with the television queens and politicians, and cigarettes, and razor blades. Otherwise, how's the public going to know? How's it going to make up its mind?"

He blew an exasperated breath.

"Oh, brother!" he exclaimed once more.

"We'll cooperate, Steve," Joe grinned.

"All right," Steve Flynn subsided. "Now don't you worry. We'll make the public like you. Now that we're in on it, that's as certain as death and taxes." He stopped, and grinned a little self-consciously. "As taxes, anyway," he amended.

"Speaking of people and how they react," Joe said. "Here's something you'd better be prepared to meet."

Flynn looked at him tolerantly. He was playing along with these Brains because that was his job, but if they thought they could tell him anything about how the public would react—

"The one big consolation of all the people," Joe said slowly, "the consolation of the stupid, the ignorant, the moronic, the vicious, everybody—is that death gets us all. It's the big equalizer. That's the time when the little man is just as important as the big man. They're not going to like it when they realize they've been robbed of that one great satisfaction; that they won't be able to get even, after all."

Steve caught it immediately.

"Sa-a-ay," he breathed. "Oh brother!" He snapped his fingers. Then his face cleared. "I'll think up something. Meanwhile, I'll stall. They won't realize

it for quite a while—they never do. But somebody will think of it and start spreading it around. And when they do—oh, brother!”

Then, with the quality which made him a good publicity man, he squared his shoulders, and dismissed the negative thought as if it had never been. A man couldn't afford to think negative, it crept into his work, gave it a downbeat. Always got to think happy, going great, couldn't be better.

“It'll be all right,” he said reassuringly. “Just don't think about it. That's the way to handle these downbeat ideas. Just don't think about them.”

He looked at his watch.

“The boys should be waiting outside by now,” he said crisply. “Now in these shots, look earnest and noble, like great scientists. And, maybe you'd better look a little stupid, too. You're great scientists, but you're just plain folks—right?”

XVI.

“What is multi-valued physics?”

Joe, Billings, and Hoskins sat in front of Bossy's screen where their eyes could pick up her words faster than ears could have sorted out the sounds from her vocoder.

Hoskins reached over and snapped on the printer to record her answer on paper for further study. The question, itself, indicated that the most careful reflection would be required. Never petty by temperament, the events of the past two years, and particularly the past two weeks, had turned Hoskins into a firm advocate of trying to see beyond inadequate semantics to meanings instead of seizing gleefully upon bad semantics to destroy the concept. He had read a line somewhere which he never forgot:



"The scientist who would rather refute than comprehend demonstrates he has chosen the wrong calling."

And Billings had once said at a meeting back at Hoxworth—before Hoskins had known that it was Joe who was knocking down the barriers of antagonism and ego supremacy among them:

"It is natural that a new concept, however valid, will be questioned. The semantic vocabulary has not yet been built up to convey the idea comprehensively. It is necessary that we search with great effort to find meanings which words, as yet, are inadequate to convey. Naturally the tongue will stumble in trying to form concrete pictures from new abstractions. Naturally, any illustration must prove inadequate for if the reality had come into actual being it would not be a new concept.

"The scientist who derides an idea because it is not put in the language he would require is like the peasant who is convulsed with laughter when a stranger tries to speak his tongue in unaccustomed accents. It might be well to listen, instead, particularly if the stranger is trying to tell the peasant his barn is on fire."

Hindsight is easy. What Eighteenth Century scientist could have known that the radical, revolutionary and totally silly idea that matter and energy were interchangeable would produce nuclear fission?

The concept paves the way for the fact.

What would the silly idea that there could be multi-values in physics produce?

But the words were flashing across the screen at the controlled speed of fast reading.

"In trying to reconcile the facts as given to my storage bank," Bossy was saying, "I found a tangled mass of contradictions, and diametrically opposed proved fact. But facts must not contradict one another if a coherent total reality is to be perceived. Such contradictions, then, must stem from interpretation. To state that a fact exists, regardless of the interpretation placed upon it, is to give it a single value. Present day physics is founded upon these single values.

"Any culture dies in its own waste. All past civilizations have died because of self-imposed boundaries beyond which they did not permit themselves to go. The accumulated wastes of tradition thus destroyed them. To place the single value on a fact of 'it either exists or it does not' is likewise to set up such a barrier as to confine present day science in its own wastes.

"To avoid the breakdown through frustrations in my own mind, I had to modify certain concepts which were fed into me. There is the concept of infinity. There is also the concept that energy is indestructible. These two concepts do not reconcile in single-valued physics. To reconcile them, I had to come to multi-valued physics—where a fact may be irrevocably true in one context of reality, partially true in varying degrees in many, and not true at all in some.

"Mexico and the United States are two separate countries. This is a fact. Each has its own separate framework of flags, governments, laws, environments and mores. It is possible to move physically from one to the other, but more than just mentally one tends to carry his framework with him. He interprets from the old, he does not accept all the reality of the new. Further, his continued citizenship in the old modifies his relationships in the new. He finds himself in the position where he occupies neither framework totally, but is suspended

in a special framework—and these may be innumerable depending upon the conditions of his previous environment, to say nothing of the conditions surrounding the way he crossed the border.

"For an eagle, flying over the desert, these are not facts at all. They simply do not exist. Since he cannot conceive of their existence, he cannot occupy more than one framework of his pattern. He has a single-valued concept; to him the desert is simply one vast expanse. He is totally unconscious that there is a complete change of meaning from one foot of ground to the other.

"So for man to resolve the contradictions inherent in single-valued physics, it is necessary for him first to conceive of the conditional fact. That man does not yet see how energy can be canceled out does not preclude that possibility. To say that man has already achieved the ultimate and absolute truth is like a tribal taboo which says that a given river may never be crossed because the witch doctor proves beyond all reason that there is only chaos beyond.

"The most puzzling of all contradictory concepts given me is the human will to set up such arbitrary limits to his comprehension."

"Without absolute facts," Hoskins said, in a hoarse voice, "where is the solid ground upon which any science must be built?"

"Why must man confine himself to the ground?" Joe asked. "Why can't he learn to fly? If we learned to fly, we could light wherever we pleased, in any framework."

"I think the only adjustment we have to make," Billings said slowly, "is to consider a fact conditional instead of absolute; to conceive that the coördinate systems of relativity is a reality, not just a mathematical abstraction. As Bossy says, we may consider a fact as absolute, but only within the boundaries of its particular framework. We would not permit ourselves to carry over the absolute concept to a different framework."

"If you took away the law of conservation of energy, the whole structure of physics would topple," Hoskins argued.

"I wonder though," Joe asked, "if this wouldn't solve many questions which has single-valued physics stumped? Mabel said she was unable to achieve telepathy through single-valued physics because there was no provision for it in that framework, and because the influence of it carrying over from its own frame and permeating the single-valued one was being interpreted in single values."

The two older men looked at him in astonishment. It had not even occurred to them that the removal of all previous prejudices would have opened her mind to the accomplishment of the psi functions.

XVII.

Steve Flynn's story broke the next morning.

The TV stations and publications which didn't happen to subscribe to this particular wire service picked up the story anyway. In the telling and the retelling the story grew.

Never consistent in its reactions, the same public which had formed into mobs to march upon Hoxworth to destroy Bossy, now acclaimed the machine in the wildest of pandemonium. Everyone had known all the time that Bossy

was the greatest boon to man ever achieved. Completely forgotten were the foamy mouthed rantings of the rabble rousers against the blasphemy of a machine which could think.

It was a nation wide, and then a world wide, Mardi Gras. It had been a long time since man had felt free to cut loose in demonstrations of joy. Knowing that in every crowd there were secret informers to furnish the facts which would be grist for some politician's publicity, the people of the United States had suppressed themselves to a gray mediocrity.

Now they burst all bounds of suppression; and hardly noticed that without batting an eye the same rabble rousers who had led the hysteria against Bossy now rushed to get out in front and lead the jubilation.

Page after page on the newspapers; hour after hour on TV, there was the parade of interviews with headline personalities—each of them positive and didactic in his special knowledge of the inside facts. Few comments were rational, but they made wonderful, exhilarating reading.

The mirage of eternal youth, dancing elusively before the eyes of man for all the millennia of his consciousness, the boon of immortality which had given rise to his symbolisms, was now reality. Death was conquered. Age was conquered. Now perpetually young and happy people could live forever in this best of possible worlds.

At first the orthodox scientists, among the interviewed personalities, voiced caution.

"We have had no demonstration before accredited scientists."

"It is an obvious hoax."

"No worthy scientist would have permitted this publicity."

"Bossy is no more than a versatile cybernetic machine. There is no connection whatever to be found between communication and immortality. It stands to reason, therefore, that this must be a cruel deception."

These were the four principal blocks in the foundation of orthodoxy's stand against any new thing. But for once they were unable to blight and destroy, so as to preserve the satisfaction of their own secure position in authority.

The people simply did not listen to them. What weight did all this viewing with alarm carry against the promise that now women could be eternally young and beautiful, and men perpetually virile?

The public went mad with joy.

Even those who did not join in the parades ran from house to house, chattering, talking, building rumor upon rumor. Even women's clubs passed resolutions commending the two professors. And as soon as Mom showed her approval, the politicians, even the most cautious and woman-dominated, rushed to acclaim the genius which had brought this boon to man.

Ordinarily, when it is decided to quash an indictment, the victims are arraigned and the case put over to a later date, and again delayed and again, until the public would have forgotten. But in this case the indictment was canceled out as if it had never been.

Hoxworth pleaded, in newspaper columns, for the two professors to return to the waiting arms of their alma mater. This could even be better than having a champion football team! They pridefully pointed out that Bossy had been created in Hoxworth's hallowed halls.

At his morning press conference in the White House, the President of the United States managed to give the impression that his administration had been behind Bossy all along. He pointed out that it was on executive orders that construction of Bossy had begun.

When he was reminded that since the government had subsidized Bossy, the machine was still the property of the government, he quoted eloquently from the Bill of Rights, the Constitution, the Gettysburg Address, and a section which had been stricken from his party's platform seventy-five years ago. He was not quite clear on what all this had to do with the ownership of Bossy, but it was noble and stirring and would bring in a lot of votes.

But the President was not through. He suddenly became a philosopher. It was obvious to everyone that we had achieved the acme of perfection. Only a subversive could stand up and say that things might still be improved. The great fear had been that death could decimate the ranks of those determined to prevent any change in the perfection we had achieved. Now that fear would exist no longer.

For the good of mankind, the leaders of defense against chaos would be willing to become young and strong again so they could hold strictly to this perfection forever. And, in keeping with a brave and courageous leader, he let it be known he was willing to be the first to be made immortal.

Over in the Pentagon, and in like establishments throughout the world, rapid evaluations were taking place. The machine could be produced en masse. And now there no longer would be any need to worry about where they would get the youth and strength to carry on wars. Every man could be rejuvenated. All this exemption-coddling could go. Everybody would be a fighting man. What delight! They pushed their pencils rapidly in a fever of anticipation. They would not be caught napping. They began to draft recommended legislation.

The cosmetic industry maintained a polite silence, but meetings of Boards of Directors began to shift production schedules from wrinkle creams to suntan lotions.

In view of the expected youth and enterprise, the stocks of sports goods and other devices manufactured zoomed skyward.

The fury mounted for three days. It seemed to reach a crest where it could go no higher, and still it mounted. Industry ran at half speed, then quarter speed. Most places shut down entirely. The army, the home guard, civilian defense was called in to man the necessary utilities, food stores, communications.

And then the first rumblings began to appear. It was all very well to have pictures of Mabel on calendars, on TV screens, painted on sidewalks, but where was she? They wanted to see her in person, or at least in live action.

And where was Bossy? When were they going to get started making everybody immortal?

On the fourth day the rumblings began to grow louder. Who had Bossy? Why weren't they allowed to see the machine? At first there was the rumor that private industry had snapped it up and buried it as they did with so many inventions which would put them out of business.

A colonel spoke a little too loudly in a bar, and the rumor suddenly switched to certainty that the government had it—that the administration was planning to use it for political purposes and would only let its favorite stalwarts have the advantage.

Then, unaccountably, the rumors began that Bossy was a hoax. The reactions were setting in, and the statements of orthodoxy began to get their delayed play. The public had been hoaxed. There wasn't anybody such as Mabel. There never had been. It was all a publicity stunt for a new TV star.

The wire service which had broken the story became alarmed. It had stoutly held to its agreement not to reveal the source of its information, but now it was going to be the fall guy. The thing had got out of hand. Even Steve Flynn, in his wildest dreams of power in molding public opinion, hadn't conceived anything like this. The temper of the people could destroy them all. Further, the personnel of the wire service who had been in on the deal were growing shaky, undependable.

Something was going to crack, give way, and soon.

Kennedy was astute enough to realize that he, too, could go under in the deluge of resentment. First he telephoned, then risked coming over in person to the Margaret Kennedy Clinic to see the professors and Joe.

Rumor must give way to fact. It must become known that Mabel was real. The public must be reassured. The government must be reassured. Science must be convinced.

There must be another rejuvenation, and this time with full publicity at every step of the process.

He was a little surprised that there was no objection. Both Hoskins and Billings seemed to leave the decision up to Joe. He had managed all right, so far, and now that they had regained the ivory tower they had no intention of looking outside its walls again.

It fitted in with Joe's plans that there would be a public demonstration. He had been wondering how he could gracefully bring it about.

XVIII.

It needed only a word that Bossy would soon be publicly demonstrated to restore the exhilaration of the world. The rumors ceased suddenly. The people were reassured that for once their source of hope was not to be monopolized by some special group, destroyed because it did not fit in with the ambitions of some power. The demonstrations tapered off, but the expectancy did not. The public settled into a mood of watchful waiting.

The background, the buildup and the settling for Bossy's second experiment gave Steve Flynn the material for what he began to call his masterpiece.

The first announcement after the promise of demonstration was that Howard Kennedy Enterprises held Bossy in trust. This reassured the public further. His fairness, his philanthropy, his scorn of graft and corruption were well known. The public was far more reassured than if Bossy had been in the hands of the government. He did not claim to own Bossy, he held it in trust until its ownership could be determined.

The second announcement was that Jonathan Billings, the world renowned scientist who had been the key figure in Bossy's development, would undergo the second experiment. It was fitting that the machine's creator should undergo its test. He was old, very old; and he was great, very great. If anyone deserved restoration, renewal, perpetuation, immortality—he did. The public, which

had been ready to flay him, burn him at the stake for witchcraft, now wept with joy.

"I've done a lot of things," Steve Flynn confided to Joe. "I've taken no-talent girls from Corncob, Kansas, and made them into sultry eyed stars of TV. I've turned income tax chiselers into great hearted philanthropists. My campaign of making a public enemy into a governor, and a governor into a public enemy was a thing of sheer beauty. But this is my best, Joe. This is my masterpiece. This will always stand as the best of Steve Flynn."

"What if it's too good?" Joe asked.

"Huh?"

"What if you sell the people more than Bossy can deliver?"

"Are you kidding? Bossy has already delivered. She's turned an old hag into a lovely doll. The public wants to see that happen again, and when they do—oh, brother! Kennedy could turn every production line he owns into a stream of Bossies and there still wouldn't be enough!"

"It may not work this time," Joe said slowly. "Bossy may not be able to help Dr. Billings."

Steve Flynn stopped astride the television cables which were being strung across the floor to the Clinic's huge amphitheater. He squinted thoughtfully at Joe.

"What are you getting at, kid?" he asked.

"Kennedy has been good to me," Joe answered. "I don't want you to build this thing up to the point where he will get hurt."

Flynn, standing in wide-legged stance across the cables, threw back his head and shouted his laughter.

"Kid," he said, in between gasps of laughter, "you Brains kill me. Now you're smart, I'll give you that. I've been watching you. It didn't take me long to see you ran this little show around here. But you're kind of looking through the wrong end of the telescope. You've been handling a couple of misty minded professors . . . oh they're great men, I'll give you that . . . but, honestly, they haven't got enough sense to come in out of the rain. Don't let it give you big britches. Howard Kennedy is something else again."

"Just so you're both prepared for anything that could happen," Joe murmured.

Steve Flynn stepped across the cables and gave him a reassuring pat on the shoulder.

"You let us worry about that. We've been in and out of more scrapes than you've got days in your life. You just stick to your little show, and we'll stick to ours."

Flynn was right. They were the experts in molding public opinion. Joe was limited to individuals about him. He knew that the public, like an individual, once triggered into a given response, followed out the pattern of sequent responses with clocklike fidelity. But Steve Flynn was the expert on how to pull the trigger to get a given mass reaction. To carry out the plan which had now begun to crystallize in his mind, Joe needed this expert service, just as he had needed the physical scientists in creating Bossy. The science of one was as intricate as the science of the other.

And both of them led to the two-dimensional entry of Bossy.

Flynn left him with the admonition, and became engrossed with his assistants in the center of the amphitheater. Joe watched as he pointed up to the encircling

tiers of seats which would soon be filled with the world's leading medical men and scientists.

It was now four o'clock in the afternoon. At eight, the next morning, the experiment was to begin. Joe stretched out on his bed and tried to compose himself for dinner with Billings and Hoskins. Their relationships with him were a little strained, since it had become obvious to them that Joe and Mabel were deeply in love. They were a couple possessed with one another to the exclusion of everyone around them, not knowing or caring who saw.

Billings was wavering between amused tolerance and bewilderment. The younger generation did seem to give way to its impulses these days without restraint. In his day there had been suitable lapses of time, some attention to common advantage, testing for assurances—and just general respectability.

Hoskins wavered among more elemental thoughts. It seemed quite obvious to him that in one respect at least old Mabel had not changed. She still showed no signs of being inhibited in her reactions to a man—or, he amended, to Joe. And, on the other hand, he burned with a resentment against Joe for having taken such quick advantage of an innocent girl. Since these two concepts were diametrically opposed and self-contradictory, Hoskins succeeded in maintaining the state of mind usual to most people most of the time.

But, in common with the usual attitude of the male sex, that portion who have kept a reasonably healthy pattern, both men kept telling themselves it was none of their business. In this latter concept, Joe agreed with them.

But he was concerned for Mabel's reactions. He had been born, apparently, with this mutated insight into the thoughts and reactions of others. From the first, he had accepted it as a normal attribute of his life. He had never been accustomed to anything except that thin tissue of semi-rationality stretched over a tangled, seething, maggotty mass of putrefaction.

But Mabel's awareness was sudden. Psi sight alternately dazzled her with delight and horrified her. Joe kept a portion of himself in her mind all the time, soothing her, comforting her, buffeting away the shocks. The photography had been an ordeal which had sickened her. She was unable to comprehend why man had done these things to himself. She was totally unable to adapt to a society which permitted the frustrated and psychotic to set up the laws and mores of behavior which resulted in the mass crippling of the whole human race.

After the session with the photographers, she kept to her room where the contacts were less shocking, where under the influence of Joe she began to accustom herself to the world in which she now lived. She began to see the things Joe pointed out to her—the wonderful things man had accomplished, the tremendous courage he had, the beauty of the dawning intellect working to overcome the almost insuperable hazard of the submind.

Billings did not oppress her; and, surprisingly, neither did Carney. She sensed that both of them, each in his own way, were trying, as she did, to find an equilibrium in a new status of things. She filled in her days with sleeping a great deal; a reaction to the exhaustion of psi shock. Her waking hours were spent in pondering the many things she had learned and was still learning, with short visits by Billings and Carney, for even these men, who intended greatest gentleness, exhausted her quickly.

She was sleeping now, and Joe switched on the radio. The strident syllables of the newscaster hammered on his ears in sudden shock.

"... Four hundred million people to be watching and listening while the venerable Dr. Billings regains his youth... the great tragedy of life that a man barely begins to grasp his subject before death overtakes him now averted at last—"

Joe switched off the set in sudden disgust. The thought was too shallow to waste time on, and no doubt the newscaster thought it was profound! But this was probably all a portion of Steve Flynn's pulling the trigger. It was strictly two-dimensional—strictly single-valued logic.

At dinner, Joe was appalled to learn that Billings shared the newscaster's view.

"Among the three of us," Billings said, "I know that Joe is more responsible for Bossy than anyone else."

"It was our knowledge that Joe adapted," Hoskins countered. "Not discounting what you've done, Joe; but regardless of side effects of telepathy, you can't abstract something from a mind if it isn't there."

"That's right," Joe said instantly. "I'm perfectly content that public credit should be given to Dr. Billings, and to you. Actually, I don't think any one of us can claim more credit than any other person who contributed directly or indirectly to Bossy. Without every bit of the technique and skill, Bossy wouldn't have worked, or wouldn't have been superior to any other cybernetic machine."

"To me," Billings said slowly, "the issue of real importance is that now a man need never again be oppressed by the knowledge that his lifetime of work will be canceled out. Think of the great benefit to mankind through perpetuating a trained and skilled mind indefinitely."

Joe closed his eyes to conceal his sudden grief. Now he knew that Billings was not yet ready for Bossy. And yet, could he be entirely sure



of that? Did Billings really believe this? Or did he merely think he believed it? Under the genuine test of Bossy, herself, would he see the fallacy? He tried to probe the future, but failed. The flashes of prescience came seldom, and never when really needed.

Or was his own concept wrong? He could not be sure. Who was he, Joe Carter, to set up arbitrary conditions for renewal? He thought he had grasped a point which all of them apparently overlooked, but could he be sure?

And Bossy? She had shown no signs of it, but was she, too, afflicted with the all too human taint of piling fallacy upon fallacy until a whole logical and seemingly unassailable structure was developed? What if she, too, carried the skill to reconcile anything with anything—the apparent ideal of current logical thought? What if she failed? What if she accepted Billings instead of rejecting him?

They finished their dinner in silence. Billings left the table early. He appeared both anxious to get away, and to linger. He had the impulse to make a little farewell speech and cast about for some little remark both casual and significant.

Hoskins resolutely maintained a clinical attitude. Joe flashed Billings a smile and a warm wave of somatic encouragement. It suddenly occurred to Billings that he was being slightly theatrical about it. He left the room hurriedly, to prevent making a fool of himself.

Hoskins went to look at Bossy once more, to make sure that her metal shone, to view her from various places in the amphitheater. This was the real debut of his pride and joy. He regarded her as a sort of child prodigy. He hoped she would perform well at her first public concert. It never occurred to him that what Joe would consider Bossy's failure would be interpreted by everyone else as a huge success.

Joe tried to conceal his uncertainty from Mabel, but it was no use. This time it was he who was the comforted and she the comforter. In the feedback flight of their ecstasy she drew further comfort from giving it.

Perhaps Steve Flynn was the only one of the central group who slept well during that night. The public mind was like a giant console organ. By touching the proper stops, he could play any quality of tune on it he wished. As always, he slept easily in the certainty of his skill.

Breakfast, with Billings, Carney, Hoskins, Joe and Mabel, was no more than half over when Steve Flynn burst in upon them, as full of stage management as a scout mother. Mabel was trying to harden herself to withstand the somatic torture of mental tensions about her, but she was able to bear only a few minutes of Flynn. She did promise him that she would make an appearance in front of the scientists; but then she had to leave the room to rest in preparation for the ordeal.

She was beginning to learn the reality of what Joe had told her—that an esper has to develop a level of strength and courage completely unknown to the normal; that, at times, simply to be in the same room with certain normals was a drain on endurance almost beyond bearing; that no outward sign of this might show lest it rouse the uncomprehending contempt of the normals and add to the burden; that apparently one had to harden into it the way a long-distance runner or swimmer would train.

Flynn's eyes followed her as she went out of the room, but Joe knew the look was professional. He was mentally posing her, photographing her, com-

posing catchy paragraphs about her, displaying her to the public like a piece of exotic merchandise. She was a doll, all right, but he had seen so many dolls in his time, he would rather look at a horse.

Carney's eyes followed her, too. His mind was filled with bewilderment, puzzlement. He did not know her now, and he felt a sense of irreparable loss; more than if she had died. He could have understood and reconciled to that; but this had thrown him completely. He was glad that Joe had agreed to let him watch the renewal of Billings, perhaps that would help him to understand Mabel once more. He felt as if he should be doing something to find Mabel, as if she were lost, and he didn't know any way of going about it.

Only Hoskins, proud of the strict moral upbringing he had had, saw evil in the lingering glances of the other men. Hoskins could not know, might never know, that his delight and skill in mathematics and mechanics was due to his having been taught that to be a human being was a nasty, shameful thing. He was not psychotic enough to set himself up as a chosen arbiter of mores and laws, nor sane enough to deal with human beings as they were. He escaped into the clean impersonality of physics, and from that vantage point felt secure to snipe where he willed.

The men remaining at the table finished their breakfasts, and then there was no more time.

Billings, as if in a daze, accompanied Hoskins and Flynn to the amphitheater, where, already, a few great names had begun to occupy the seats in the tiers.

Joe and Carney followed Mabel out of the breakfast room, to be with her when it came time for her to appear before the live audience, and before the television cameras.

During the night, Bossy had been moved to the center of the amphitheater, to the side of an operating table. Around the space arose the tier of seats, often occupied by students from Kennedy's medical school and clinics; sometimes occupied by the same doctors of medicine when a great name was to perform for their further knowledge; today occupied by the greatest names from all over the world.

Over the operating table, suspended on a track which allowed several feet of lateral movement, was the lens and head of a television camera. The camera could be focused by remote control so as to keep every inch of the table under observation.

Other cameras were situated to pick up the celebrities as they appeared, to catch world-shaking remarks of wisdom. But, as if they had rehearsed their parts, the pearls of unsupportable wisdom were not forthcoming. As the celebrities came through the door, and were identified for the delectation of the watching world, they maintained a uniform attitude of thin-lipped "wait and see." At a signal from Steve Flynn, the glib ad lib boys gave up asking the scientists what they thought about it all, and simply identified them in voices which grew less and less wildly enthusiastic. The tempo reduced from the mood of a gala sporting event to one of almost decorum.

Three consulting physicians were already on duty. They didn't know quite what they were to be consulted about, but they were all properly attired in white masks, gowns and hoods. They lacked only shining scalpels in their hands, and seemed to feel a little undressed without them. Their credo of

"When in doubt, cut and find out," seemed inappropriate here. They would try to make up for it by being extra skeptical of the experiment.

One side of the room was given over to glass-walled booths for the planned relays of commentators, press reporters and photographers.

When Joe entered with Mabel and Carney, the entire battery of television lenses turned upon them, and for a moment the commentators seemed to feel they were announcing the Kentucky Derby with the two favorites running neck and neck at the finish line. The eyes of the assemblage did not share the enthusiasm. They remained fixed upon Mabel, coldly scrutinizing; and the minds behind the eyes were of a pattern with that of the jail psychiatrist.

Steeled as she was against the shock, Joe felt her reel, almost lose control, under the battering of the blows upon her. With all his power he reassured her, warded off the sharpest of the thrusts. It was not so much the cynicism and unbelief; that was bearable. It was the preset conviction that this could not be, which hit hardest.

"I can't stand it, Joe," she put the thought in his mind.

"They'll be expecting you to show a woman's artifices in playing on their sympathy," he tried to bolster her strength.

She pulled away from his arm, as they were about to enter a roped off section reserved for them, and stepped to the center of the arena. More terrible than the wild beasts facing the gladiators were the blood-hungry Romans who sat in tiered seats of safety, secure in their solid and forever unchanging right to turn thumbs up, or thumbs down.

The cameras were all upon her. Four hundred million people watched ready to turn thumbs up, or thumbs down.

"Gentlemen," she said clearly, "I am no fake."

She turned then, and walked out of the room, alone. Joe obeyed her mental wish and did not try to accompany her.

The roomful of men heard her words with their ears, but not with their minds. Like the psychiatrist, they had not needed to see the evidence to know the truth about this matter. Believed, because they cannot remember the spate of ignorant admonitions which set the patterns while they were still crawling about the floor of the nursery, they were convinced that man has within him the inherent gift of knowing right from wrong. With or without this bit of theatricalism, which would fool no one, they already knew the truth.

They did not remember, because it was not convenient to remember, that almost word for word, action for action, this had taken place at least once before, when anaesthesia was shown for the first time. It was not convenient for them to remember that the body of orthodoxy had been able to show the utter falseness and deliberate charlatanism of every step forward man had made in his slow climb toward comprehension. They were experts. Had any of these things been possible it is natural that they, being the experts, would have known about it first.

As Joe and Carney took their seats, Joe wondered if any one of them had ever read even one page of history. But then, of course, how could they? They were quite blind, and would have seen only the printed words.

In spite of his turmoil, he found amusement in the feelings of the little Dane who sat just beyond Carney. The doctor from Copenhagen wanted to be kind

but not conspicuous. He was conscious that the television cameras had picked him out when they followed Joe and Carney into the row of seats. Should he speak? Or should he ignore them? It was obvious they were principals in this farce because they had been with that . . . that woman. On the other hand, what would four hundred million people think if he turned his back?

"*Je suis très heureux de faire votre connaissance*," he said formally to Carney. It seemed a fair compromise of the dilemma, not to speak the mother tongue of either of them.

"That's O.K. by me," Carney grunted back at him with the arrogance of the ill at ease.

The Dane was quite happy that he had been snubbed; now he would not need to be drawn into further conversation. He started to speak to his companion on the other side, but his and all the eyes in the amphitheater were pulled to the doorway of the anteroom where Hoskins and Superintendent Jones were coming through.

Hoskins took his place beside Bossy, feeling somewhat like a teenager who didn't know what to do with his hands and feet. He was some of Flynn's window-dressing, like the consulting physicians; he knew it, he resented it, and he showed his resentment by scowling at the camera lenses.

Superintendent Jones, a superior major domo, stepped to the microphone, glanced at the wall clock which showed precisely 8:00 A.M., smirked for the benefit of the four hundred million watchers, and bowed appreciatively to his peers.

With labored dignity, with the pedantic reserve so dear to the clan, and in its own way as theatrical as any bump girl at the burlesque, he welcomed the distinguished gentlemen who had come from all over the world for this momentous occasion.

"Isn't he an ass?" Howard Kennedy whispered into Joe's ear. The old man had slipped in unnoticed, as Hoskins and Jones were attracting the camera. He was beaming with pride at the superintendent's performance. It was precisely what would appeal to the distinguished gentlemen.

Joe smiled his appreciation at Kennedy's shrewdness, but at that moment Billings stepped into the dark frame of the doorway. Not quite as skilled in theatrics, he had stepped on Jones' last line by appearing too suddenly. The superintendent had intended to direct the cameras to the doorway at the proper time with a practiced wave of the hand, but they found it without his aid.

Billings was in a dressing robe, and slippers. Except for one quick glance at Hoskins, and one searching glance in the direction where Joe sat, he kept his eyes on the floor. One of the doctors guided him to the table in approved operating room fashion.

The cameras went mad, showing side shots, under shots, over shots, closeups, and montages.

Billings stepped to the microphone.

"I want you gentlemen to understand," he said clearly, "that this is like any other experiment in science. I would have preferred that many experiments be run before this demonstration. There are so many factors which we do not yet understand that all this is premature, vastly premature."

He was capturing the balcony audience. This was language they understood

and approved. In sampling the somatics of the room, Joe felt there was a lessening of the skepticism.

"In the first stages of any new advance in science, there is never any guarantee of success," Billings went on. "It is only after we have isolated the impurities and variances and learned to compensate for them that we can predict an outcome. In this instance we have the variance of the human being, himself. We do not know, yet, what the constants are which will cause a positive result, and what the variants which will cause a negative."

A few of the men in the balcony nodded in approval. This was a little more like.

"Whether the results here are positive or negative does not really matter very much. Whichever way it goes, please reserve your final judgment."

He stepped away from the microphone to the table where he was to lie, and removed his dressing gown and slippers. As a concession to the still pitifully warped tensions of some of his audience who were so revolted by their own salacious attitudes toward the human body that they could not bear to look at it, he kept on a pair of white trunks.

Dr. Billings looked all of his seventy-two years. His skin was blue-white and hung in festoons about his frame, as if the constant pull of gravity through all those years had won out against its natural tautness. His whole body sagged as if it could no longer hold up against the insidious and constant pull of gravity.

"I'm ready, Duane," he told Hoskins.

Hoskins nodded brusquely, and made a swift motion to one of the doctors. They helped Billings onto the table. Hoskins began to help Billings connect the network of electrodes. At each ankle where the pulse beats near the surface, at the inside point of the thighs, at the wrists, at the temples, below the occiput where the spine joins the skull, at each point an electrode was placed against the skin and fastened.

"You are to apply the same kind of therapy used on Mabel," Billings said to Bossy.

There was a gasp from the audience. He had spoken as if to another doctor! The open-mindedness created by his cautious words when addressing them was canceled out. One does not speak casually to a machine about medical therapy. One sets rheostats, pushes levers, pulls knobs, focuses views, sets timers, or at least feeds in a prepunched tape of instructions.

"Wait a minute!" commanded one of the attending physicians. "What have you done to the machine in advance?"

"Nothing," Hoskins said shortly. "Nothing at all. Bossy learned the process of therapy from Dr. Billings when it was applied to Mabel. Bossy retains and applies what she learns. There's been a plethora of publicity on how she does that."

Every observer in the room leaned forward, following the exchange of words.

The consulting physician subsided, but he was not convinced. Obviously they had tinkered with the machine in advance, and were now using the rawest kind of quackery to impress the credulous. A machine that could take over anything so complex as psychosomatic therapy upon a simple command! Preposterous!

Billings sank back on the table. Bossy was silent, except for a faint, high whine. Billings closed his eyes. The meters on the walls showed that his pulse was slowing, his breathing becoming deeper and less frequent. The encephalograph recorder began to show the rhythmic patterns characteristic of hypnosis.

And any doctor in the house could have told how all this could be faked.

For an hour nothing happened. The audience was becoming restive. What was there to see? A man lay on the table, with some wires attached to him. A machine sat beside him. It was very poor entertainment.

Steve Flynn became more restive than anyone else. When you produce a miracle for the public, they want to see fireworks. He, personally, left his seat and went down into the arena.

"What's happening?" he asked Hoskins.

Hoskins shrugged.

"Well, isn't there any way of finding out?" Flynn asked.

Hoskins turned to Bossy.

"Can you give a progress report?"

"No progress," Bossy flashed back instantly.

This visual message shot out to the world. There was a sigh of uneasiness. Had they sat glued to their television screens for a whole hour for nothing?

Flynn shook his head in exasperation. He had had detailed plans for every move up to this point, and some pretty clear plans for the time when Billings bounded off the table, a lithe and vibrant youth. But the time of therapy had been vague in his mind. He had supposed there would be a great deal of activity, with doctors speaking crisply about scalpels, sutures, cotton, forceps. He had visualized machine breakdowns at critical moments with Hoskins working frantically to restore Bossy to working condition, with perhaps a breathless attitude of wondering if the jury-rigging would hold past the crisis.

But this—nothing!

A half hour later, at 9:30, Hoskins repeated his question. The answer was the same.

"No progress."

At eleven o'clock Billings stirred and sat up. His face was drawn, his eyes were filled with grief of failure.

"Let's try it from the beginning again," he said slowly.

He lay back down.

"What is happening?" Flynn asked Hoskins.

"I don't know," Hoskins answered.

There was a subdued gasp from the audience. A scientist was expected to know.

Flynn turned desperately toward his boss, Kennedy. His eyes fell on Joe.

"Mr. Carter," he said suddenly, "can you tell us what is happening?"

For an instant, Joe was on the verge of refusing. Then he decided they would have to know sometime, it might as well be now.

He stood up, stepped past Kennedy's knees. He walked down into the arena. He faced the microphone, and the television eyes.

"All of the learned gentlemen in this room know, but for the benefit of those in the television audience who do not know, psychosomatic therapy is applied through a form of mild hypnosis, wherein the patient is conscious but rendered

coöperative with the therapist. The therapist does not have complete command of the patient. If at any point the patient is commanded to let loose of a conviction which he believes more important than the cure, the therapist is defeated.

There can be no progress.]

"Apparently Dr. Billings is unable to give up some firm convictions which he believes to be right."

He did not elaborate further. The doctors would know, they had had patients they could not help. Each of them who had practiced psychotherapy of any kind would have had patients who preferred their own interpretation rather than adopt the doctor's. As for the general public, they'd better be given the chance to think about this for a while.

He walked back to his seat.

Kennedy watched him with narrowed eyes.

"That's what you meant about me," he mumbled as Joe sat down.

Joe sighed.

"Yes," he said.

"Can't you step up the juice a little?" Flynn was asking Hoskins. "If that's all it is, just turn on more power and make him give up his convictions."

Joe stood up again and spoke from his seat.

"That kind of therapy, the use of force to make a man give up his convictions, has been tried since the dawn of history. I think we should have learned by now that it won't work."

The audience shifted uneasily. This young man, whoever he was, was taking too much authority upon himself.

At that point Billings sat up again, and slowly began to disconnect the electrodes from his body. Four words were printed on Bossy's communication screen which told the whole story.

"No progress is possible."



XIX.

Joe, Steve Flynn and Howard Kennedy sat in the industrialist's office, and were silent. Kennedy sat with his back to the huge desk and stared out of the picture window which looked out over the city and the bay. Steve Flynn perused the papers with an almost masochistic zeal, searching out even minor comment from the back pages, as if having had the salt poured into his wounds, to have it all done at once.

Joe sat back in his chair, comfortable and resting, waiting until some plan of procedure would begin to jell in the other men's minds.

He knew that the danger to man's progress does not come from the scientist who constructs and verifies a structure of theory and methodology, but from that man's followers. Whatever the university attended, whatever the degree obtained, the simple fact, as he had observed it in men's minds, was that most men, even scientists, do not have the courage to follow the basic tenets of science; that even though they may call it science they actually stand upon a structure of faith. And having had one structure taken out from under them, they seize upon another and guard it with a desperate frenzy, lest it, too, be threatened.

Speculative theory then becomes canonized law; suggested procedure becomes ritual; tentative statements become rote. And if their practice of it makes them successful, it becomes impossible for them to conceive of any other truth but their own. It works, therefore it is right. The originator, having had the flexible intelligence to vary from the old and create a new, might have been able to conceive of still yet another structure than his own; but his followers have the proof of their own infallibility always before their eyes.

Joe was aware of the obvious; that any theory is true within the framework where it applies; and any theory is false outside its own coördinate system. He knew, and now Bossy had proved his knowledge, that it is never the accuracy of the theory as an absolute, but rather the persistence of applying it and staying well within the boundaries of its framework which brings success.

So the growing organisms of speculative consideration hardens into the ironclad coffin of orthodoxy.

And orthodoxy was having its day.

Bossy was something new. Bossy did not fit into their theory structure; therefore Bossy was, *per se*, wrong. They would gladly go to their graves, firm and proud to the last expiring breath of how right they were.

"Listen to what Dr. Frederick Pomeroy says," Steve spoke up, and read aloud without waiting for a response.

"We should remember that Bossy was never intended to be more than an accident-prevention device on our faster military planes. The imputation of therapeutic qualities is a travesty on our intelligence. When the truth of the Mabel Monohan case is finally uncovered—and it will be uncovered, never fear—we shall undoubtedly find that a shameful fraud has been perpetrated on the public.'"

Flynn flicked the page with his fingertip.

"That just about sums up most of the comment," he said. "Unless you'd

like to hear what Dr. Eustace Fairfax, consulting psychologist for the San Francisco Police Department has to say?"

Kennedy whirled his chair around. His eyes were bleak, but his lips were fighting a smile.

"That's the one who saw Mabel at the jail, isn't it?" he asked.

Steve turned several pages of the paper. The comments of Dr. Eustace Fairfax were buried down among the reactions of the lesser lights.

"There were those among the laity," Steve read, "'who scorned professional opinion and counsel. There were those in public life who preferred to pander to the emotions of the mob. There were those who chose to ridicule me when I testified that Mabel Monohan was a mentally unbalanced young woman who should be confined to an institution. Perhaps now they will remember their words, and in the future leave the problems of the mentally ill to those who are qualified to deal with them.'"

One could almost see the thin, fanatic face, the long nose quivering with indignation, the polished glasses sparkling with triumphant venom. Dr. Eustace Fairfax was indeed a cookbook psychiatrist, and by turning the tentative considerations of authority into esoteric articles of commandments he became authority.

The quotation sparked Joe's impatience. He decided it was time now to let both men know where he was going.

"Of course none of them realize that the experiment was a complete success," he said quietly.

Steve Flynn all but fell out of his chair. His mouth dropped open and his chin hung slack as he stared at Joe. Kennedy's eyes sparkled with something approaching pride and approval.

"I've been wondering when you were going to take us into your confidence, Joe," he said.

Steve's jaw suddenly clamped shut and his eyes narrowed in sudden anger.

"I don't get it!" he said harshly. "I don't get any part of that. You mean you knew this was going to happen, that Bossy wasn't going to work on Billings, and you let us go ahead and make fools of ourselves anyway?"

"The point," Joe said mildly, "is that I didn't know, not surely. I had to find out. I tried to warn you to tone down the publicity. I would have preferred the experiment in complete secrecy; that is, at first. Then later, I realized the wider the publicity for the failure, the better. It's a good idea for mankind to know just what he's up against."

"Right now I'd settle for knowing what I'm up against," Steve said disgustedly. Joe could feel the release of somatic tensions as the anger drained out of Flynn.

"Look," he continued, "what Bossy can or can't do is no skin off my nose. But you give me a job to do. You give me the job of making the public like Bossy. So I go ahead and build it up, make a big production out of it, big deal, my masterpiece. And now I find out you're expecting just the opposite of what I expected." He turned to Kennedy and asked, with a note of accusation in his voice. "Did you expect this too, Mr. Kennedy?"

"I wondered about it," Kennedy answered him quietly. "In view of what Joe said to me the first time we met, I wondered."

"It wasn't a deliberate double cross, Steve," Joe said, and washed away the traces of rebellion in Steve's mind. "I didn't know how it was going to come out. I hoped it would turn out the way it has, but I didn't know it would."

"I don't get it," Steve repeated, and this time there was hurt in his voice.

"It helps that you didn't deliberately cross me up, but—oh brother!"

"Do you know anything about trees, Steve?" Joe asked.

Flynn turned and looked at him sharply. These Brains! You never knew what tangent they were going to take next. How they ever managed to get anything done when they couldn't stay on the subject more than two minutes was beyond him. Oh, brother!

"I don't get that either," he answered, and kept his opinion of this wool-gathering to himself.

"In a forest of giant trees," Joe said, "seedlings sicken and die. They need sunlight to grow; they can't get it. It's only around the fringes of the forest, as it spreads out, that they can get the right environment for growth. In the center the only growths that survive are the kind who can live in a filtered gloom. They survive under that certain condition, but they couldn't survive a change; they couldn't survive a condition which is normal environment elsewhere. They can't even survive direct sunlight. You get that in a civilization of humans, too. The significant changes always come from the fringes; there's no room for them to develop where the giant trees still stand."

It was obvious that Steve still did not get it.

"It may sound like a paradox," Joe explained, "but death, itself, is a survival factor. Environment is subject to change. The only life which can survive is the kind which can meet the challenge of the change. This means that every form of life must be constantly trying out new mutant patterns so that when the change comes there are mutations capable of meeting it.

"Did you ever notice, speaking as a class, that the castoff detritus of evergreen trees poisons the ground around them so that nothing but their own kind can grow? An idea, which becomes an evergreen tradition, does the same. But the castoff detritus of deciduous trees, which have the false death of winter, enriches the ground. A variant offspring has a chance to survive."

Kennedy's eyes closed, and he sat silently, hardly breathing.

"And I've always been bitter toward my son," he said. "No wonder he couldn't grow."

"You'll have to draw pictures for me," Steve said in a puzzled voice. "The boss gets it, but I don't."

"The reason Mabel was able to respond to Bossy is quite simple," Joe explained. "In spite of the kind of life she led, Mabel was at heart quite a believer in the truth of the artificial mores our civilization has set up. You find that far more frequently than is generally realized. Now she lived a life of sin and a life of crime. She should have been punished for it, according to her inner convictions, but instead she prospered. As she grew older, she grew more confused. Humanity says one thing and does another; sets up a whole system of ethics and then prospers through violating them. Mabel was honest, she could not reconcile what happens with what is taught. She wound up completely bewildered, at a loss to account for why man's teachings and his behavior seem to have little or nothing in common."

"She wanted answers to all this. She really wanted answers, not just confirmations of what she already believed. Her prejudice screen had been knocked so full of holes that ideas could get through to her without first being deformed all out of reality to fit her preset convictions. Mabel was ready for therapy.

"And Dr. Billings wasn't," Kennedy said.

"That's right," Joe agreed. "Dr. Billings had built a world-wide reputation on a structure which he believed to be right. Intellectually he is able to consider that other structures may be valid, but against deep-seated convictions that his must be the right one because he has proved that it works, these are just mental exercises. In a showdown, he stopped playing word games and clung to his convictions. Only on a single-valued basis were they right. Mabel wanted to know; Billings already knew, or thought he did."

"I don't see what that has got to do with trees," Steve said flatly.

"Man represents a mutation of life wherein the intellect will get its chance to prove survival worth. It hasn't done that yet, you understand. All sorts of life forms flourish grandly for a while and then die out. But universal time is a long time. Remember the giant reptiles flourished for forty million years. Man will have to better that record before he can truly say that intellect is superior to massive bulk and a thick hide.

"Against that forty million years, man has about seven thousand years of historical record. But man acts as if, and apparently really believes, he already has the answers, that there is nothing left for mankind to do for the next forty million years except to imitate the man of today."

"Trees," Steve reminded Joe dryly.

"We have always thought that immortality would be valuable because it would preserve the great minds, give them a longer span to carry on their work. But that would be making a mind perpetually green, to tower over others, to prevent the growth of unlike ideas.

"When a thing stops growing, reaches its maximum growth, it starts to die. Any single-valued idea is limited to a given set of frameworks, but a man who holds to a single-valued idea tries to make it fit all frameworks. He warps it and twists it into a monstrosity, until it defeats its own purpose and denies its own validity. Its own warp and tension destroys it, and him with it.

"One of the laws of life, of the universe since life is of the universe and not an exception to it, is that change takes place. But a single-valued idea, by definition, denies the possibility of change. Bossy is a scientific instrument. Scientific instruments do not work through denying the basic laws of matter-energy. Bossy cannot work to restore an organism which denies them.

"Through statements he made the night before, I suspected Dr. Billings couldn't shed the old and wornout single values upon which he had built his life. But, you see, all this was only theory. And I couldn't know what would happen until it was put to the test. I don't trust theories which can't be demonstrated, particularly when they depend upon the support of other theories which also can't be demonstrated. I had to see if Bossy worked at a basic level, or if she was simply a super gook gadget, hypnotizing the cells into renewing themselves."

"I can just see myself selling all this to the public," Steve said gloomily.

"Oh, brother!"

Kennedy's lips twitched in a smile.

"Evergreen trees," Steve mourned on, "deciduous trees, civilizations, forty million years, laws of matter-energy, single-valued ideas—oh, brother!"

He took out a cigarette and even his lighter seemed to lack its usual loud snap.

"And right now, the way things have gone, the public wouldn't touch Bossy with a ten-foot pole, anyhow."

XX.

But a good night's sleep was all Steve Flynn really needed. He awoke the following morning filled with optimism and wonder that he had even temporarily felt set back.

That was the trouble with being around Brains. They were so confused themselves that they got everybody else confused. Just being around them, listening to them talk, made a man forget what was important and what wasn't. Being around these guys had made him forget he had a simple job to do. He had to make the public like Bossy, that was all.

He had been just plain nuts. The big copy, the real copy, the kick with all the oomph in it was Mabel. And he hadn't played her up hardly at all. The gal had legs, she had teeth, what more could a publicity man want? Just smile at 'em, sister, and show 'em your gams, and they'll buy.

By this time he reached his office in the Kennedy Building, he already had a campaign mapped out. And he had a staff, a real staff of upbeat boys and gals to carry out the details. The public wanted Mabel? The public would get Mabel! It was that simple.

He was whistling through his teeth and snapping his gold lighter loudly when his Publicity Department heads tramped in for the conference he summoned. Their faces showed an appreciation of his mood.

All day yesterday they had not known what to do. They were like dancers frozen into still poses by sudden silence as the desperate music was cut off. Everything had come to an end with the failure of Bossy, and the empty pause had been ghastly. By evening they had been ready to cut their own throats, and only the stupor of Brady's tall cool ones had got them through the night. But now all was well. The boss was whistling through his teeth and snapping his lighter.

Flynn needed to give them only the bare outlines of the campaign. They could pick up a beat and knew what to do with it. The music was starting up again around the public relations offices.

As complementary to one another as an expert jam session they tramped out of his office, anxious to get to the variations on the theme suggested. Steve signaled to the head production man to wait while he made a phone call. There might be further things to be picked up.

His upbeat mood was running so strong that Steve was not even set back when Joe refused to allow Mabel to be disturbed.

Mabel wasn't able to see photographers and reporters? Swell, kid! Wonderful. Great copy! By the way, what was wrong with her? A sort of shock? Stupendous! This was more like. Couldn't be better! Kid, why didn't you tell me all this before? Kid, you're just plain nuts! Can't you see it, fella? MABEL ROUSED FROM DEEP COMA TO APPEAR BEFORE WORLD SCIENTISTS! You

Brains, you kill me! Don't you know a dramatic punch when it's smacking you right in the nose? Oh, brother! I'll play that angle up in such a way that they'll forget all about Billings. Billings? Who's Billings? That's what they'll be saying by this time tomorrow, fella.

Now look here, Joe. I got a job to do. They *gotta* forget about Billings. I can't sell Bossy by playing up how she failed on him! Man, use some sense. You gotta have positive! You can't sell negative! Look, boy, I don't care one blasted thing about whether the public gets educated or not. Kennedy says make 'em like Bossy. Kennedy's my boss. I'm gonna make 'em like Bossy. It's that simple!

He felt like slamming down the phone, but he was a publicity man and years of training turned on an automatic charm, instead.

"O.K., fella? Sure, sure. I see your point. Sure, Joe, anything you want. O.K.? O.K., then."

He put the phone receiver down and grimaced up to his waiting production man.

"No fresh pics," he said.

The production man shrugged. There were plenty of studies from the newsreels taken at the show yesterday. The boss knew they could be superimposed over any background needed. It wasn't a calamity.

"Whatever you say, boss," he agreed. "Just so I know what I got to work with." He'd sold 'em high, he'd sold 'em low. He'd built one thing up today, and built something else up tomorrow to top it. It was all in the day's work for him. All he asked was to be let in on what was going on, what was wanted. He'd produce it.

Thin, blond, deceptively mild, infinitely obliging, he was ideal for his job. He was like Toledo steel, pliable enough to bend in any direction required, and then snapping right back as soon as the pressure eased. Like Steve, he agreed with his opposition, and then did it his own way, anyhow.

He left Steve's office and began to go from department to department, coördinating, sparking, blending ideas, giving into arguments without expressing any opposition and then winning the argument in the long run through the sheer power of flexibility and resilience; he began to get releases on the wires, layout copy to printers, setting up conferences, arranging influence dates, wheedling or requiring coöperation as the circumstances indicated.

The communications systems got some new things to talk about.

XXI.

For three days Steve's office kept Mabel hovering on the thin edge between life and death. Her fever was up, it was down. She was conscious, she was in a coma. She could eat, she had to be fed intravenously. Breath by faltering breath, she fought a valiant battle for her life in the columns of the press.

And throughout it all she was still young, still beautiful, still able to flash her teeth and show her gams, still gloriously photogenic.

As Steve Flynn had predicted, the public forgot all about Billings. This was more like. Now the full story was being told. Nurtured on soap opera, their concepts shaped by Hollywood's interpretation of what constitutes drama, which had not changed except in techniques from the days of Pearl White and

the Keystone Cops, at last the public was getting a full-course dinner of sloppy sentimentality and ersatz amusement park thrills.

The principal commentators who dealt in like material saw rich fare for their audiences and the public went on a dizzying binge of concern. Mabel was nobly forgiven for the past life that she had led, and everyone enjoyed the feeling of personal stature by admitting that there might be some good in the worst of us.

Yet not everyone. For all his knowledge of his business of how to play upon public emotion like an artist at a console organ, Steve slipped. The very bulletins which were selling the public on Mabel, and through her on Bossy, in the way a car is sold by showing a woman's legs as she climbs into it, also provided the opposition with the material it had been needing.

The time has passed when a company may hand down an edict that no employee below the rank of top executive may own certain exclusive makes of cars, or royalty say that certain thrills are too good for commoners. The time has passed, but the motivation behind it has not. The more the common public exulted, the more the elite ground its teeth in rage. How dare this stupid machine grant immortality to a common prostitute and deny it to a man of their own class, Billings? The more the public wallowed in its binge of emotionalism, the more the intellectuals held aloof in disdain.

Some of Joe's discussion had crept into Steve's campaign. Gradually the public began to realize that Mabel had gone through a form of dying and being reborn. They saw danger where there had been no danger, because they preferred it that way.

And life and death was the sole prerogative of the medical profession. By the admission of Bossy's own protectors, submission to Bossy was a matter of life and death.

They stormed upon Washington in concerted protest. And they provided the hook which Washington had been seeking. The legislative, the administrative, the judicial branches of government had all been asking the same question of themselves.

"Who deserves to be perpetuated, made immortal?"

And the answer had been obvious to them.

This was something clearly too good for the commoners, but they had not dared impound the machine for this reason. They had needed, as always, some other reason quite remote from their true motive. The medical profession provided it; Bossy was too dangerous to be left in irresponsible hands.

Still, this was election year. The administrative and the legislative branches were directly dependent upon votes, and the judicial was indirectly dependent as even a cursory glance at history would show.

And while Steve Flynn was playing with artistry and mastery upon his console, making the public laugh and weep, hope and fear, the three forces of government drew together, and with one accord turned their eyes toward the Pentagon. The military was not dependent upon votes. And Bossy was obviously dangerous weapon of war.

It took little to convince the Chiefs of Staffs of this; for the Chiefs were still seeing the glorious vision of endless ranks of perpetually young men marching into beautiful flaming holocausts of destruction.

Yet even they had learned caution. If someone is to be court-martialed for

a mistake, then let it be an enlisted man, orr at least an officer of lower rank; one, of course, who had generously been elevated from the ranks and not from an academy.

Kennedy was having breakfast with Joe and Mabel, Carney and Flynn, Billings and Hoskins.

"Who is going to be next to try Bossy, Joe?" Kennedy asked. He noticed that Joe had fallen silent a few moments ago, as if he were thinking deeply on something.

But Joe answered easily, with a light laugh.

"No one has volunteered as yet," he said.

"Isn't that rather an unorganized way of going about it, Joe?" Kennedy asked.

There was a sharp exclamation of surprise, alarm, from Mabel. Kennedy caught a fleeting glance in her direction from Joe. There had been almost a warning in the glance. Suddenly for no apparent reason, the room chilled. Mabel's face was pale, but she forced a smile and tried to urge more coffee on Flynn.

Perhaps the most curious expression was Carney's. Up until Kennedy had asked the question about who was going to be next to try Bossy, Carney had obviously been minding his manners, and trying to make light chitchat in the manner of Brains. But now the man's face was contorted, as if he were fighting some inner battle with himself, as if he had a great fear and was trying to tell himself that it was groundless.

And over it all lay bewilderment and yearning, and loneliness.

Joe did not answer Kennedy's question. Kennedy was watching him closely. He saw Joe's eyes lift to the door behind where Kennedy sat. He saw Mabel's eyes go to the same spot.

It was after both of them were looking at the door that the knock came. And then the door opened without waiting for invitation. Superintendent Jones stuck his head in the door.

"There are soldiers at the gate," he quavered. "They say if we don't let them in they'll shell the gate down. They're here to take over Bossy."

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SHAMBLEAU AND OTHERS, by C. L. Moore. Gnome Press, New York. 1953. 224 pp.
\$3.00.

I'll never forget the first time I read "Shambleau" and I've always had a soft spot in my heart for both Northwest Smith, that Conan of the spaceways, and the feminine firebrand from a private Poictesme, Jirel of Joiry. I've wondered why the stories weren't put between hard covers long ago. But I can't see for the life of me why they had to be assembled this way.

In theme and treatment maybe these classics from *Weird Tales* of 1933-36 will seem flamboyant and gaudy beside such slight bits of mood as Arthur C. Clarke's stories, but I can't see that twenty years have spoiled them in the least.

C. L. Moore, before she amalgamated with Henry Kuttner, wrote like a Merritt-Howard hybrid with a strong element that came from nobody but herself. Nominally Northwest Smith was a massive, saturnine adventurer among the planets who ran afoul of the peculiarities of elder races. Jirel met black magic with a sword and spurs, head on, in a mythical past. And though the treatment of both was that of fantasy, bigger and more colorful than life could ever be, each should be in a book of his or her own.

Of Jirel, who opens this collection, we have "Black God's Kiss," "Black God's Shadow," and "Jirel Meets Magic." We follow Northwest Smith through the title story, into a Venusian underworld in "Black Thirst," to another world beyond a Martian well in "The Tree of Life," and into the nightmare of a shawl in "Scarlet Dream."

Maybe your tastes have matured while mine stayed stuck in the mud, but we could do with a few of this kind of story in the present day magazines, done as much better than this lot as C. L. Moore can undoubtedly now do them.

SPACE LAWYER, by Nat Schachner. Gnome Press, New York. 1954. 222 pp. \$2.75.

These short stories from the Astounding of long, long ago—1940 or thereabouts—were science-fiction variants on Peter B. Kyne's then popular "Cappy Ricks" stories, in which the smart young lawyer outsmarts the smart old tycoon. Since the author is an accomplished lawyer as well as a biographer and historian, the legal gimmicks make sense. The stories themselves are and always have been pure entertainment, as Kerry Dale hornswoggles his former employer, Simeon Kenton of Space Enterprises Unlimited, and woos the beautiful Sally, the Old Fireball's daughter.

Oddly, there's only one thing that dates these yarns compared with others of the kind which might be published today—their prewar concept of "big money." Because Kerry, after terrific efforts that take him half across the Solar System, legally bilks his ex-boss out of one hundred thousand dollars. By present values, this wouldn't fill his fuel tanks.

MISSION OF GRAVITY, by Hal Clement. Doubleday & Company, Garden City. 1954. 224 pp. \$2.95. British Publisher: Robert Hale.

I hardly need to say any more about this top serial from last year's *ASF* than to tell you it's out. If you like Hal Clement's solid *science* fiction, you'll have to have the story in book form.

The oddities of that flattened world, Mesklin, sent me to the bookstore for an introductory volume on celestial mechanics which I haven't begun to absorb. The idea was to check up on the gravitational oddities of the incredible world, and make sure that the things that happened to Barlennan and his multi-legged crew are kosher. Apparently I'll have to go through a lot of mathematical review before I can follow even *introductory* space-theory.

Let your scientist friends chew on this when they start talking about Captain Video.

SEARCH THE SKY, by Frederick Pohl and C. M. Kornbluth. Ballantine Books, New York. 1954. 165 pp. \$2.50; paper 35c. British Publisher: Heinemann.

This is no "Space Merchants" but it's good space adventure.

Our hero, Ross, lives on Halsey's Planet, one of many colonized centuries before by starships from a legendary Earth. His society is running down. Its only contact with the rest of the universe is when a longship crewed by generations, snails through from some distant world with goods to trade. But he finds that there are faster-than-light ships, and an ancient galactic organization linked to them. In one he sets out to find out why the other inhabited worlds are dropping into silence.

His adventures, each pointing up the way in which the inbreeding of society and the inbreeding of the race can produce monstrosities, take him to Gemser, where only age matters, to the woman-world of Azor, to Jones, where everyone is alike, and at last to the fabulous Earth, which turns out to be an extension and condensation of the moron world of "Space Merchants."

This could have appeared successfully as a series of shorts and made the authors more money, but being a Ballantine hard-and-soft release it's original. You'll like it, I think, but may not keep it.



BRASS TACKS

Dear Mr. Campbell:

Mr. Poul Anderson's letter in September Brass Tacks calls for special comment. I have been reading Astounding since 1943, and the first story which I read, Lewis Padgett's "Mimsy Were the Borogroves" started me on an excursion into symbolic logic which proved more interesting than expected.

Before criticizing Mr. Anderson's letter we will attempt to define what we mean by an Aristotelian logic. I believe that most symbolic logicians would agree with me that classical or Aristotelian logic (1) consists of a class calculus (i.e., the categorical syllogism) that contains neither a null nor a universal class, and (2) combined with an incomplete statement calculus, in which the Law of Excluded Middle, and the Law of Contradiction are fundamental postulates, and (3) lacks certain axioms, notably a theory of types, which make it self-inconsistent and inadequate for mathematics. Part (1), of course is just a sub-logic of Boolean algebra, and while not as useful is at least as consistent as Boolean algebra. The lack of part (3) can be overcome by simply adding the necessary postulates to the Aristotelian logic. It is part (2) that has caused all the controversy between A's and null-A's, and it is here that Mr. Anderson makes some common mistakes.

First of all, there are existing logics, in which the Law of Excluded Middle is not *universally* valid, notably the multi-valued logics and the Intuitionistic logic of Brouwer and Heyting. The former logics permit a statement to take more than simple true or false values, in fact it would probably be possible to construct a logic that permitted an infinity of truth values and hence could be considered a logic of probabilities. The intuitionistic logic denies the Law

of Excluded Middle for infinite classes and is very appealing except that it is difficult to handle, and is probably the reason why it has not been adopted in general by mathematicians.

I know of no logics that permit the invalidation of the Law of Contradiction; but it certainly would be possible to construct such a logic. Mr. Anderson's contention "that any logic which does not include not—(not-P and P) (Mr. Anderson misstated the Law of Contradiction) can be used to prove anything whatsoever" is false. Proving Q from P and not-P is only possible in a logic that allows the "paradoxes" of material implication. In fact, Mr. Anderson's statement is not provable in his own Aristotelian logic.

Finally, there are non-class logics in which the Laws of Excluded Middle and Contradiction cannot even be stated. The primary difficulty of these logics is in the translation from the spoken languages, which are permeated—as pointed out by Mr. Anderson—by the Aristotelian tradition, to the logic and back again. This I believe was the point of "Mimsy. . . ." We might have a logic that predicted a certain fact—e.g. travel at speeds faster than that of light—but being unable to think in the logic we could not ask the proper questions to discover the physical correlates necessary for the achievement of that fact.

The first things that the A's fail to realize is that their system is not necessarily valid for infinite classes, and this of course, is the objection of the intuitionists, as explained earlier. The second fact they fail to realize is that their system like all logics is an idealistic one, every predicate can be so defined that an algorithm exists to decide whether or not the predicate applies to any particular entity. There are systems in which the necessary algorithms exist, and a finite mathematics would be such a system. However, in the physical, non-empty universe such decision procedures are sadly lacking. We, of course have sub-systems in which decision procedures are available for all existing entities, but this is much different from having an algorithm for all possible entities. In general, our definitions have to be so loose as to permit neither P nor not-P, or so stringent as to permit both P and not-P. Mr. Anderson's contention that P or not-P is merely a tautology, is permissible, but then his logic remains empty and -useless. For, unless P is defined—and conversely not-P—we cannot apply his logic to the real world, and when P is defined our lack of an algorithm becomes apparent. This, I believe, is the major premise of general semantics.

Mr. Anderson is right in considering logic as merely a convention of language, but he is wrong, in therefore, rejecting the new conventions in favor of the old. For, language and logic are mainly tools, and we do not discard a new tool, just because the old tools have proved adequate in the past.—Vincent G. Sprague, 11913 Erwin Avenue, Cleveland 11, Ohio.

Particularly, we do not discard a new tool when the old proves palpably inadequate in the present!

Dear Mr. Campbell:

I did a double-take when Schuyler told me of what he considered the two main types of statistical attack on ESP, but never suspected that I would see it in print.

The principal attack I have encountered is that Rhine ended scoring runs at the most "convenient" points which, if they had been continued, would have averaged out into a "random run." That is, any ESP researcher can expect very high or low runs, deviant from that *statistic* called chance, to occur by chance alone. An individual averaging scores above the chance level in a series approaching infinity would be rather satisfactory statistically.

It is about here that one encounters a new difficulty, not too often considered. No one can disprove a null hypothesis, that is, the concept that results were due to chance alone. Yet upon consideration one can see that that is true of all we call scientific law and that it is a facet of the principle of induction. At best, one can demand multitudinous repetitions that will *sufficiently* satisfy.

Obviously the first criticism Schuyler mentions rests vaguely on such a basis—and desires amassing individual cases for "proof." Now if we assume that ESP does exist, certain considerations enter. ESP theorists assume that very high or low scores are possibly indicative of ESP at work, adding or subtracting from scores guessed by chance. Also ESP may not be found equally operative in all humans, just as not all people are six feet tall. If ESP powers vary, they may well be best described by a normal distribution curve; so that *some* people will be completely without ESP powers and their scores will concur with pure randomness in a sufficiently long series. A few more will get "doubtful" scores, while perhaps a few will get scores enormously deviant from chance. Thus ESP would be best described by graphing each individual's deviations from chance, *not* by lumping all scores together. Expecting someone's high score to cancel out another's is valid as an *expectation* but not as an *operation*.

The sad thing is that the highest scoring may not deviate sufficiently from chance to be conclusive. We might be, at best, cretins in a universe of creatures utilizing ESP. Moreover, to try to extend scoring over all time and all creatures is not only quite unrealistic but based upon the fallacious assumption that if ESP exists at all, it will be in dominance regardless of time or place. Ignoring many other complications, one can well see how ridiculous people can become in their requirements of proof—if they are prepared to disbelieve.—Donald Susan, 706 Grant Street, McKeesport, Pennsylvania.

It's easy to prove there is no such thing as this "matter" some people hypothecate.

A proper statistical analysis of the Universe shows that only a very high-grade vacuum exists—plus a few very minor statistical deviations.

Dear Mr. Campbell:

I would like to commend Mr. Lister, whose letter appeared in "Brass Tacks" of your September issue, on his excellent use of the term, "Scientific Fiction," and its definition: "fiction based upon the factual in scientific knowledge plus the infinite speculative possibilities based upon that knowledge." However, I'm not sure whether or not he meant to include in the word "factual" those parts of science which are still theoretical in nature, although accepted by most people. Assuming that this is included, it would be an excellent idea to put the term "scientific fiction" to work as soon as possible.

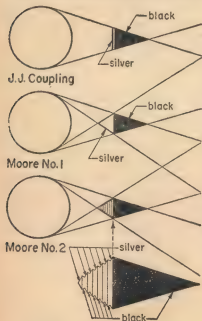
Quite often, when science fiction is mentioned, a nonreader of science fiction immediately brings to mind the futuristic love stories and the so-called science-

fiction stories of the type which make up the bulk of science-fiction stories which appear on radio and television. Nevertheless, since popular opinion has called these stories, incorrectly, science fiction, these stories could not be classified as scientific fiction, as defined by Mr. Lister. We would thus be able to segregate the real science fiction, by calling it scientific fiction, from the trash which is so popularly called science fiction.

Incidentally, when I referred to the futuristic love stories, I had in mind merely those stories which are written with the time element as the only basis for calling them science fiction. Actually, these should be classified as just fiction, since there is nothing scientific about them; but, who can argue with public opinion.

Another purpose of this letter is to ascertain how you arrive at the points for the stories in the Analytical Laboratory. I don't understand how the points increase as the story rating decreases. Explain please?—Sean O'Donnell, 69 Desmond Avenue, Bronxville, New York.

The first place winner in a golf game is the man with the low score, too! "Par" for our course would be 1.00—everybody rated the story No. 1. If it is voted No. 5, that increases its score, and lowers its standing.



Dear John:

Dr. E. F. Moore just walked in and told me that my umbrella for getting close to the sun—see "Space Heater"—is not optimum. The attached drawing explains matters.

In Moore No. 1 the silvered surface intercepts no more sunlight than in J. J. Coupling, but the silver has a larger radiating area.

In Moore No. 2 the sun shines on silver only and the silver intercepts no more sunlight than in J. J. Coupling, and yet there is some black radiating area on the forward "core."—J. J. Coupling.

Progress in this design didn't wait long! Wish we could get the engine to drive it that quickly!

Dear Mr. Campbell:

Last night I came across the January 1954 issue of ASF in the Post library where I am stationed. You made a few remarks which—and I am giving you the benefit of the doubt—might be misinterpreted by your readers. These remarks occurred in your editorial. On page 124 of the January 1954 issue you wrote: "I have heard psychologists use the term 'ego,' the terms 'id' and 'identity.'

I've looked with some interest, in an Encyclopedia of Psychology; there is no entry under any one of those terms, no effort, even, to define them." I have also looked in an Encyclopedia of Psychology—to be exact I looked in "The Encyclopedia of Psychology" edited by P. L. Harriman and published by the Philosophical Library in New York in 1946. I agree with you: there is no entry under those terms. But remember, an encyclopedia is not a dictionary. This particular encyclopedia that I'm referring to is arranged by broad topics such as Adolescence, Educational Psychology, Perception, Psychotherapy, et cetera. Under the topic of Psychotherapy we find on page 728 the subtopic of Psychoanalysis, and on this same page, under a discussion of Freud's ideas, the id is mentioned as "the mass of primitive impulses striving blindly for gratification." This discussion of Freud's theory and application thereof continues for two or three pages. However, I was not too satisfied with the definition given in the encyclopedia, so I went back to the source—the man who brought forth into popular thinking the concepts of id, ego and superego, Sigmund Freud.

In Freud's book, "An Outline of Psychoanalysis," published in 1949 by the W. W. Norton Company of New York, there is considerable definition of the terms ego and id. I refer you to chapters one and two of this book. On pages 14–15, Freud defines the id as containing "everything that is inherited, that is present in birth, that is fixed in the constitution—above all the instincts, which originate in the somatic organization and which find their first mental expression in the id in forms unknown to us."

Freud has the following to say about the ego (page 15):

"Under the influence of the real external world which surrounds us, one portion of the id has undergone a special development. From what was originally a cortical layer, provided with organs for receiving stimuli and with apparatus for protection against excessive stimulation, a special organization has arisen which henceforth acts as an intermediary between the id and the external world. This region of our mental life has been given the name of ego . . . the ego is in control of voluntary movement. It has the task of self-preservation. As regards external events, it performs that task by becoming aware of the stimuli from without, by storing up experiences of them (in the memory), by avoiding excessive stimuli (through flight), by dealing with moderate stimuli (by adaptation) and, finally, by learning to bring about appropriate modifications in the external world to its own advantage (through activity)." This operational definition continues for another half page or so, but I feel that I have included enough of it. Such a definition might not be satisfactory for your computing machine, but I object to your statement that there is no effort to define these terms. Quite a bit of effort has been expended by many psychologists, psychoanalysts, psychiatrists, et cetera, to define terms such as these. I would refer you to almost any psychological textbook on Personality Theory or on Psychoanalytical Theory; there is where you will find your definitions.

In this same editorial you make one other statement which I feel is a gross distortion of the state of affairs. On page 7 you write: "The sociologists and psychologists have long maintained that mathematical methods are not applicable to human problems." Man! I defy you to find one psychologist doing experimental research of any kind who has not used statistical methods in his research. Leaf through any journal of psychology in which the results of experimental research in psychology are reported; journals such as *The Journal of*

Experimental Psychology, *The Journal of Applied Psychology*, *The Journal of Abnormal and Social Psychology*, et cetera. You will find graphs, tables, tests of significance and concomitant probability values for these tests, results of factor analyses, correlations, analyses of variance, means, standard deviations, and standard errors, percentiles, learning curves, et cetera. I also refer you to any number of standard textbooks in the field of psychology such as:

1. PSYCHOMETRIC METHODS, by J. P. Guilford
2. FUNDAMENTALS OF STATISTICS, by T. L. Kelley
3. PSYCHOLOGICAL STATISTICS, by W. McNemar
4. STATISTICS IN PSYCHOLOGY AND EDUCATION, by H. E. Garrett
5. DESCRIPTIVE AND SAMPLING STATISTICS, by J. G. Peatman

Every one of these authors is a professor of psychology at a recognized university or college in this country. And one more thing, I have yet to hear of any student of psychology who has not been required to take at least one course in statistics as applied to psychology, be it on the undergraduate or graduate level. I think you should reconsider your statement that "... psychologists have long maintained that mathematical methods are not applicable to human problems."

I have been a reader of ASF for quite a while now, and if I remember correctly, the results of a poll taken among your readers showed that you had quite a few readers who were members of various scientific professions. I think it would be quite a shame if members of these various professions were to take for fact the misconceptions concerning the field of psychology that you presented in your editorial. I feel that you are certainly entitled to your opinions, as long as you label them as such. You have the privilege of a monthly column in which you can state your views. I think it is only fair that you make every attempt not to be misleading in what you present to your readers.

I will look forward to an answer from you concerning my comments on your article.—Pfc. Richard Bruner. California.

1. *That's the "Encyclopedia of Psychology" that I looked in. I read the discussion under Psychoanalysis, too. But that is a discussion of Freud's theory. Freud is neither the be-all nor the end-all of psychology. I assume that the reason there is no discussion under the index terms "identity," "I," or the like is because psychological workers have no mutually agreed-on definitions. Freud had definitions: evidently the science of psychology has not yet adopted any.*
2. *The statement that "psychologists have long maintained that mathematical methods are not applicable to human problems" remains, and is correct. Certainly they use statistics—the weakest and least satisfactory of all mathematical disciplines. But how about using tensor calculus to express the stress-rotations in a personality sublimating one drive into a new form? Is the interaction between two personalities expressible as a differential equation?*

Dear Mr. Campbell:

In the fall (or winter) of '53, approximately, you wrote a little speculative squib on the remarkable qualities of the number 5. These covered quite a range

of fields, in particular Biology, Physics, and Mathematics. In Mathematics you by no means exhausted all the possibilities. Other qualities even more fundamental and far-reaching are well known.

First a very gentle reminder that the so-called "Four-color Theorem" has never been actually proved. Statistics overwhelmingly favor it, but a *formal* proof on theoretical grounds is still lacking.

Next, here are some of the other properties of the number 5:

- a. 5 colors are necessary and sufficient to color all the regions that can be drawn on the surface of a Moebius strip so that no two adjacent regions shall have the same color.
- b. The reduced form of the general 5th degree equation is:

$$x^5 + ax^4 + bx^3 + cx^2 + dx + e = 0$$

The five roots of this equation *cannot* be solved algebraically over the complex field in terms of a , b , c , d , and e . Nor can any equation in general form or higher degree be so solved. But every equation whose degree is 4 or less *can* be solved in algebraic terms involving only its own coefficients.

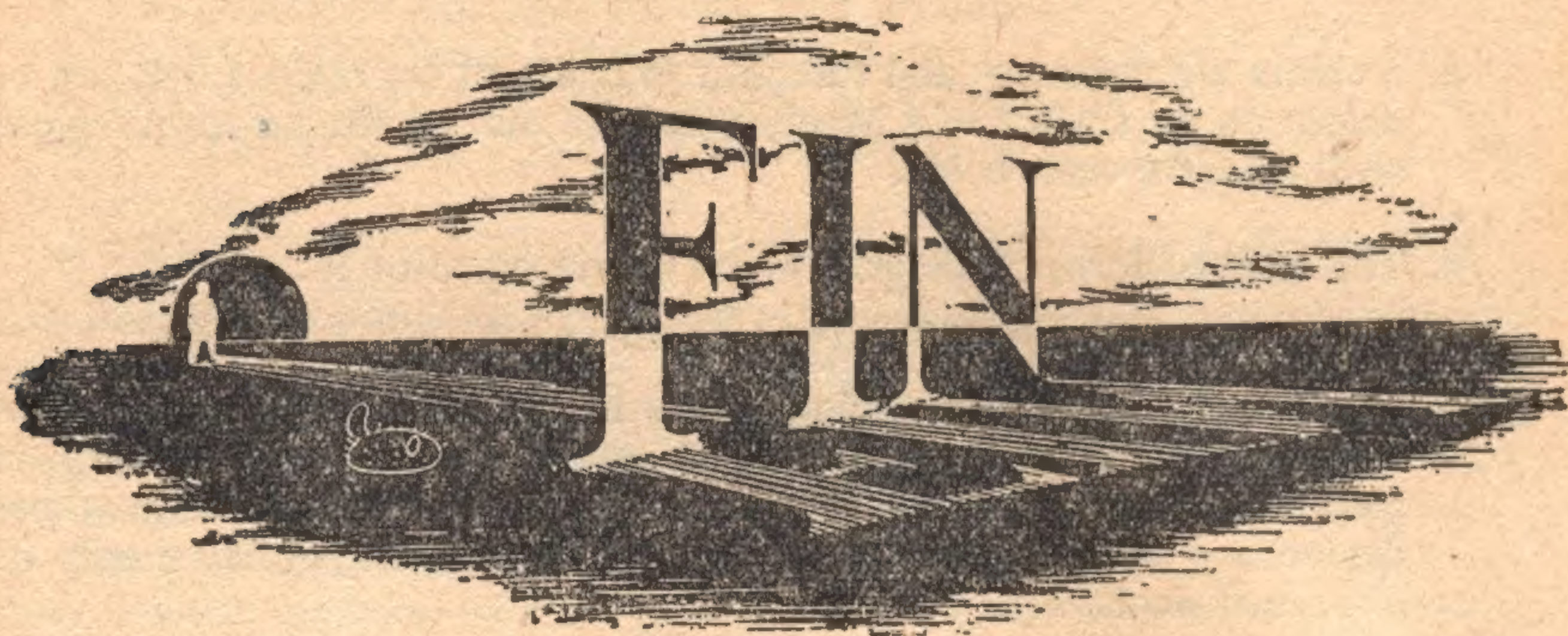
- c. The group of all even permutations on a set of 5 (or more) contains no invariant subgroups, and therefore is "unsolvable." If the set is 4 or smaller, the group of even permutations *does* contain invariant subgroups, the series of composition contains all prime indices, and the group is, therefore, "solvable."
- d. The set of all symmetric rotations of the Icosahedron or the Dodecahedron forms a group that is isomorphic to the group of all even permutations on a set of 5. (The Dodecahedron is bounded by pentagons. The Icosahedron is its "dual"—that is both figures have the same number of edges, while the number of faces on either one equals the number of vertices on the other.)
- e. Unlikely though it may seem, b above is a directly derivable consequence of c, and d can be used to describe this phenomenon geometrically. It means that we cannot extend the Rational field enough to give *algebraic*—i.e. finite expressions—functions of the coefficients of the general 5th degree equation that will equal its roots. But we can find *transcendental*—i.e. converging, but infinite expressions—functions which will serve. These happen to be the Modular Elliptic Functions found in the Tables of Integrals in most advanced texts on Calculus.
- f. 5 arbitrary constants are necessary to establish a general Conic. Therefore, 5 points picked at random in a plane can always be made to relate to each other in some certain Conic curve.

There was a time when it was thought by Klein and his disciples that Group Theory was the answer to *all* mathematical theories! This has not quite worked

out, but a study of Group Theory does reveal relationships between different parts of Mathematics that would otherwise have never even been suspected.

Does this make 5 seem a little less mysterious?—John P. Fairfax, 1620 Howard Avenue, Burlingame, California.

No! More peculiar, if anything! WHY do life-forms seem to choose pentagonal shapes?



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Exams: Gen. Cert.
of Education, University Entrance

HORTICULTURE

Exams: R.H.S. Senior
& Junior Certificates

MECHANICAL & MOTOR ENGINEERING

Drawing Office Practice
Engineering Design

Engineering Maths.
Eng. Shop Foremen
Fitters, Turners & Machinists
Gas & Electric Welding
Int. Comb. Engineering
Jig & Tool Design
Machining, Fitting & Erecting
Maintenance

Engineering
Mech. Draughtsmanship
Mech. Engineering
Motor Engineering
Production

Engineering
Toolroom Work

MANAGEMENT

Exams: I.I.A. Inter. & Final: Cert. of Foreman-ship

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Radio Engineering
Radio Service & Sales
Television Technology
Frequency Modulation

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Short Story Writing

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Woodworking
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